Aalto University School of Science
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Experiences of open innovation acceleration – motivations, benefits, challenges and concrete results for industrial companies

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Open innovation has become a renowned concept since its appearance in early 2000's. The creator of the notion, Henry Chesbrough, argues for mutual benefits of open collaboration and idea flows between organisations. Although there are companies who have embraced the opportunities of open innovation, many are still reluctant to open up toward externals and have difficulties in understanding the actual benefits of such collaboration.

Industryhack is a Finnish open innovation accelerator – an intermediary helping companies in benefiting from open innovation activities – who connects its customers with external teams possessing relevant knowledge related to a defined problem and provides a model for co-development and experimentation. This thesis sheds light to the motivations, benefits, challenges as well as concrete results experienced by eight of these customer companies who represent industries such as heavy machinery, recycling, energy and maritime. This research is based on qualitative methodology and the case study method. The main theoretical framework used is the coupled model of open innovation (Piller and West, 2014). The data collection is done by theme interviews with nine management level representatives of the case companies.

The main motivation for companies to collaborate with externals is to test new concepts and build an external talent network, which is in line with the experienced benefits. Other benefits are related to positive company culture development (towards more open) and moving the new concepts forward in pilot projects. These pilots have evolved into actual products in two of the investigated cases. The main challenges are sufficient preparations for collaboration, limited internal resources and lack of commitment from own organisation.

For future research, impacts of continuous experimentation with externals, understanding better the bottlenecks of longer-term collaboration with selected external teams as well as investigating the motivations of these external participants would be of interest.

Keywords: open innovation, open innovation acceleration, collaboration, experimentation, proof-of-concept, piloting, digitalisation

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Avoin innovaatio syntyi käsitteenä 2000-luvun alkupuolella ja on sittemmin muodostunut tunnetuksi konseptiksi niin tutkimus- kuin yritysmaailmassa. Termin luoja Henry Chesbrough argumentoi organisaatioiden välisen avoimen yhteistyön ja ideoiden vaihdannan etujen puolesta. Vaikka monet yritykset ovat toteuttaneet avoimen innovaation periaatteita käytännössä, suuri osa on edelleen haluton avaamaan liiketoimintaansa ulkopuolisille eikä ymmärrä tällaisen yhteistyön mahdollistamia konkreettisia hyötyjä.

Industryhack on suomalainen avoimen innovaation kiihdyttäjä – taho, joka auttaa yrityksiä hyötymään avoimesta innovaatiosta käytännössä. Industryhack yhdistää asiakasyrityksiään ulkopuolisiin tiimeihin, joilla on tarvittavaa tietotaitoa ennalta määritetyn ongelman ratkaisemiseen, ja tarjoaa yhteistyömallin ratkaisuiden kehittämiselle ja kokeilulle. Tämä diplomityö valottaa kahdeksan Industryhackin asiakasyrityksen kokemuksia em. yhteistyöstä ja kokeilusta motivaation, hyötyjen, haasteiden sekä konkreettisten tulosten näkökulmasta. Yritykset edustavat mm. kierrätys-, energia-, konepaja- ja meriteollisuutta. Tutkimuksessa käytetään kvalitatiivista metodologiaa, tutkimusmetodina on tapaustutkimus ja pääasialliseksi teoreettiseksi viitekehykseksi on valittu avoimen innovaation yhdistetty malli (coupled model of open innovation) (Piller and West, 2014). Aineisto kerättiin teemahaastatteluilla yhdeksältä henkilöltä, jotka toimivat pääosin johtotehtävissä tapausyrityksissä.

Yritysten pääasiallinen motivaatio yhteistyöhön ulkopuolisten kanssa liittyy uusien konseptien testaamiseen ja ulkoisen osaamisverkoston rakentamiseen, mikä on linjassa myös yritysten kokemien hyötyjen kanssa. Muita hyötyjä ovat avoimuudelle myönteisemmän yrityskulttuurin muodostuminen sekä uusien konseptien jatkokehittäminen pilottiprojektien avulla. Kahdessa tapauksista pilottiprojekti on edennyt valmiiksi tuotteeksi saakka. Yritysten kokemat haasteet liittyvät pääasiassa riittäviin valmisteluihin ennen yhteistyön aloittamista, rajallisiin sisäisiin resursseihin sekä oman organisaation sitoutumisen puutteeseen.

Jatkotutkimuksen kannalta kiinnostavia teemoja ovat jatkuvan ulkopuolisten kanssa tehtävän kokeilemisen ja yhteistyön vaikutukset, lupaavimpien tiimien kanssa tehtävän pilottivaiheen pullonkaulojen parempi ymmärtäminen sekä ulkopuolisten osallistujien motivaatio.

Avainsanat: avoin innovaatio, avoimen innovaation kiihdytys, yhteistyö, kokeileminen, proof-of-concept, pilottiprojekti, digitalisaatio

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Thank you.

Those two words summarise my feelings at the very moment. In 2008, as a freshman at Helsinki University of Technology in Otaniemi, I had absolutely no clue about the following years and what they would bring along. Now, when looking back, I can be nothing but genuinely happy and thankful for all the learnings, experiences and people these 9 years have brought to my life.

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Juuso & Lauri, 🐷➡SOON🎓!

Apollonkadulla, 7.11.2017.

Juho Kokkola

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1. Introduction

"This was also a frightening experience. Our product development cycle is at least six months and now a lot was achieved in just two days. This proves our competitors might develop new products much faster than us."

– A case company C-level representative

Recent years have shown big companies' rising interest in collaborating with people and organisations who look at the world from a different perspective. One of the current megatrends, digitalisation, is pushing these companies to learn faster about the possibilities of new technologies. Better co-operation with external talent is crucial in order to keep up with, or even better, to lead the industry transformation. Jeffrey Immelt, Chairman and CEO of GE, said in 2015: "Every industrial company in the coming age is also gonna have to be a software and analytics company." (Charlie Rose, 2015)

Knowing the inevitability of digital transformation, many companies have engaged in accelerating their innovation processes with activities such as startup incubating, intrapreneurship initiatives, idea development platforms and hackathon events, which have become ways for dialogue between traditional industries and technology savvy creators of new products and services. Although a lot is written about the context of these activities, that is the paradigm of open innovation, more research is needed to measure these kind of activities' concrete impact for stakeholders involved.

Open innovation is a paradigm suggesting that companies who open up their boundaries will experience better innovation outcomes. This means strong collaboration with external individuals and organisations is essential for a company to stay competitive. Knowledge and ideas should be able to move both into the company from outside and from the company to its external network. The talent at a company's disposal goes beyond employees and not all R&D needs to, or even should be, done in-house. (Chesbrough, 2003)

Pierre Nanterme, Chairman & CEO of Accenture, emphasises the significance of deeper collaboration between large companies and entrepreneurs: "Too often, large companies remain stuck in the early phases [of open innovation] – those that primarily involve corporate ventures and incubators or accelerators. Too seldom do large companies

collaborate in a spirit of joint innovation. Even more rarely do they participate in truly entrepreneurial innovation – collaboration among a broader ecosystem of players who are focused less on specific goals and more on continuous idea generation, testing and learning." He continues: "We found a statistically significant correlation between collaboration, innovation and growth – among both large companies and startups – in all the G20 countries that we analyzed." (Accenture, 2015)

This thesis research focuses on the impact of a company called Industryhack, an open innovation accelerator helping its customers to include external expertise in their innovation process. "We call them Open Innovation Accelerators (OIA), intermediaries, consultancies, and agencies helping their clients to accelerate an open innovation project by providing dedicated tools, methods, access to an established community of solvers or participants, but also education and process consulting." (Diener and Piller, 2013) The aim of this research is to reveal the motivations, benefits, challenges and concrete results for a company when engaging in collaboration with external individuals, teams and companies. The collaborative experimentation model provided by Industryhack is investigated by interviewing representatives of eight large companies who are Industryhack's customers.

Organisations often have tough times in implementing openness in their existing innovation processes. Common questions are related to the external actors to collaborate with (who are they and where to find them), identifying and implementing the relevant external knowledge and risks in revealing sensitive information to outsiders. "Dedicated firms [(open innovation accelerators)] have emerged that are specialized to give answers to these questions by providing services, methods, or forms of technological infrastructure to execute open innovation initiatives." (Diener and Piller, 2013)

Industryhack provides a model connecting its customers with external talent who have the knowledge to develop forward-thinking proof-of-concepts (POCs) based on a given innovation challenge. A proof-of-concept is essentially some concrete evidence demonstrating that a specific idea is feasible. Industryhack offers a collaborative experimentation process, during which the innovation challenge is defined together with the host company, the external teams are found via an application process, the teams' initial ideas are co-developed to proof-of-concepts together with the host and finally, the collaboration continues as pilot projects with the teams who have built the most interesting POCs. Industryhack aims to boost its customers' R&D processes by

providing external expertise and concrete POCs (not just ideas) which, in the best case, will lead to actual new products and services through further development and collaboration. To get the best results, host companies need to prepare accordingly for the collaboration. This means preparing necessary materials and data for the participating teams beforehand, committing key employees internally to the process as well as communicating actively about the innovation challenge within the organisation. The phases of Industryhack innovation challenge are presented in the figure below.

Figure 1: The phases of Industryhack innovation challenge from a host company perspective. The highlighted part lasts for 3 months and is Industryhack's core offering. (Industryhack, 2016)

"If you don't try, you will never know" is the classic saying which describes the philosophy behind the collaboration practice Industryhack aims to establish between its customers and the external innovator community, and in the core of this collaboration is experimentation. A case company business unit director comments their experience with Industryhack: "I think in today's world this is how we should work. You need to pilot, you need to learn – you need to try things." Experimentation as a practice has also gained attention from the public sector in Finland, where it has been selected among the five strategic priorities in the Government Programme in 2015. The key project called "Digitalisation, experimentation and deregulation" aims at one part to lower the barrier for experiments: "Systematic experimentation will be introduced and a legal basis will be created to make the arrangement of experiments easier." (Prime Minister's Office, 2015)

1.1. Background of Industryhack

The idea of Industryhack was born in Finland during a conference focusing on Industrial Internet (II) and Internet of Things (IoT) in late 2014. One of the company founders, Petri Vilén, was participating in a roundtable discussion touching the

previously mentioned II and IoT topics and their impact on Finland and Finnish businesses. The conversation went from frustration with seminars and empty talk to a consensus that there is a serious need for action. Petri threw in an idea: What if companies opened more interfaces to external developers to find new ways of working together? Juha Pankakoski, Chief Digital Officer at Konecranes, who was sitting on that table, accepted the challenge. The first ever Industryhack innovation challenge and an on-site hackathon took place in February 2015. It was also the first time for Konecranes to open up its application programming interfaces (APIs) for an external group of programmers and designers.

"Industrial internet requires breaking down industry barriers, which is why it is important to bring different players together. For companies that implement industrial IoT solutions, it's an opportunity for new growth, while ICT companies can gain new customers" says Iiro Salkari from Finnish Industrial Internet Forum. (CBS Interactive, 2015)

Industryhack's model of experimentation was something that many companies were eager to try out. Industryhack Ltd was founded in early 2015 and by the end of 2016 it had done 25 innovation challenges together with big companies representing a variety of traditional industries, such as heavy machinery, recycling, maritime, design, energy, automotive and food. In the core of the Industryhack concept is empathy, meaning that the participating external two- or three-person teams are provided with a good understanding of the host company and its industry via on-site visits and in-depth discussions with the employees.

The first Industryhack innovation challenges were hackathons, a two- or three-day on-site events where 10-15 teams first learned more concretely about the challenge at hand, then developed a proof-of-concept and finally, demonstrated it on the last day for the host company jury. A hackathon used to be a new model of collaboration between traditional industries and tech-savvy companies and individuals, but the recent years have shown it has become a popular phenomenon. What was learned quite fast, was that although the hackathon event has its benefits, the most essential value for the host company comes afterwards – when these hackathon demos are co-developed further in pilot projects with the respective teams.

Industryhack in 2017 focuses on innovation challenges where the host company has also reserved budget for follow-up pilot projects. Moreover, the participating teams get

compensated from taking part in the challenge. Not everything is packed in two or three days, but instead spread to multiple weeks, which allows the teams to have time for thorough discussions with the host company staff members, truly understand the challenge at hand and build the proof-of-concept. A hackathon is still often part of the process, but just as a tool – not everything is squeezed in it. This approach has risen from the customers' hopes as well as from Industryhack's decision to focus more on substance (teams and POCs) and less on event organising. Focusing on follow-up pilot projects also reflects the aim to create a larger scale impact. As Iiro Salkari from Finnish Industrial Internet Forum states: "We often notice […] that collaboration is needed on many levels. Fast trials and demonstrations cannot necessarily create large, systemic changes. On a local level, change can be controlling a factory machine with a smartphone, but systemic change would mean an autonomous factory where there are no people. This requires a different approach." (CBS Interactive, 2015)

1.2. Research question and hypothesis

This study aims to reveal, through discussions with management level, the reasons laying behind a company taking part in the experimental open innovation activities enabled by Industryhack. These reasons, being both the expected benefits (i.e. motivation) and experienced benefits (including concrete results), are complemented with the experienced challenges to build a holistic view on the open innovation acceleration provided by Industryhack.

Research question:

What are the motivations, benefits, challenges and concrete results of the Industryhack co-development process from the host company perspective?

Hypothesis:

The Industryhack co-development process provides the host company with innovative proof-of-concepts in a relatively short time period. The most promising POCs are ready to be piloted both time and cost efficiently with the respective teams to validate their viability in the business environment, which is seen as the main benefit. These pilots also represent the concrete results. Additional benefits are related to company culture development as well as marketing and PR. The motivations are strongly related to all of

the aforementioned benefits. The main challenges consist of the quality of the teams and their POCs, allocated resources (time and money invested), adapting to the more agile way of product development and opening up business sensitive data to externals.

2. Literature review

This chapter describes relevant literature related to this research. It is divided into three parts: open innovation paradigm, open innovation intermediaries and experimentation.

2.1. Open innovation paradigm

This subchapter consists of the history and development of the concept of open innovation, the benefits and challenges related to it as well as views on implementing it in practice.

2.1.1. Background

The term 'innovation' was first defined in the 1920's by Joseph Schumpeter (Hansén, Wakonen, 1997). He emphasised the aspect of novelty: "innovation is reflected in novel outputs: a new good or a new quality of a good; a new method of production; a new market; a new source of supply; or a new organizational structure" (Crossan, Apaydin, 2010). Schumpeter (1934) also underlines the distinction between innovation and invention: "as long as they are not carried into practice, inventions are economically irrelevant". Whereas the Schumpeterian definition of innovation is positioned within the domain of the company, Crossan and Apaydin (2010) composed a broader definition: "Innovation is: production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome."

Since the 1970s innovation scholars have understood that innovative ideas often come from outside the firm (West et al., 2014). Teece (1986) described, in one of the most renowned articles within the history of innovation research, how the profits from technological innovation are distributed. He argues that business strategy is an important factor as "it relates to the firm's decision to integrate and collaborate". The innovating firm's boundaries are a crucial strategic variable, and instead of R&D activities, complementary assets and underlying infrastructure have a key role in defining the beneficiaries of innovation (Teece, 1986). Essential to understanding better

the innovation process is how companies search for knowledge (Nelson and Winter, 1982). In the context of open innovation, this search can be defined as "an organization's problem-solving activities that involve the creation and recombination of technological ideas" (Katila and Ahuja, 2002) and similarly as Teece (1986) argued, Patel and Pavitt (1995) state that expenditure in R&D is one element of the search process but "may account for only a small portion of investment in the search for innovations".

Teece (1996) argues that both formal and informal structures of the firm as well as its network of external linkages have a critical impact on the firm's innovative activities. However, internal R&D also has an important role: Cohen and Levinthal (1989) argue that internal R&D not only generates new information but also enhances the company's capability to identify, assimilate and exploit already existing knowledge from its environment – something they call "learning" or "absorptive" capacity. Traditionally, both economists and organisation theorists have though of companies as islands of hierarchical control, within a market structure, that use the price mechanism to interact with each other (Teece, 1996). "[The] metaphor needs to be transformed from islands to archipelagos to capture important elements of business organisation. This is because firms commonly need to form strategic alliances, vertically (both upstream and downstream), laterally, and sometimes horizontally in order to develop and commercialise new technologies." (Teece, 1996) Knowledge transfer flow today is in all directions and R&D is no longer as centralised as it used to be. "Moreover, the sources of knowledge are diffused geographically." (Teece, 2000)

User innovation is a key theme within the innovation research of the 'pre open innovation' era. Within some industries, users develop the most innovations. In others, suppliers of materials or components are the source of innovation. And in some fields, the product manufacturers themselves represent the typical innovators. (Von Hippel, 1988) Users, being both individuals and companies, are increasingly able to innovate themselves, which means innovation is being democratised (Von Hippel, 2005).

The term 'Open innovation' was coined in 2003 by Henry Chesbrough in his book "Open Innovation: The New Imperative for Creating and Profiting from Technology". The essential idea of the paradigm is that better innovation outcomes are experienced by companies who open up their boundaries. Strong collaboration with externals (individuals and organisations), knowledge and ideas flowing in- as well as outbound, non-internal R&D and external talent are considered beneficial for a company and

essential to stay competitive. (Chesbrough, 2003) The essence of the notion has remained the same ever since, with slight refinements to the definition, such as: “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively” (Chesbrough, 2006). Before opening up toward their external networks, companies used to be closed innovators. ‘Closed innovation’ is a paradigm where companies only innovate internally: all R&D happens in-house, talent in use equals employees and all intellectual property is carefully protected. (Chesbrough, 2003)

Stemming from the first introduction of the term “open innovation” and following the more recent conceptualisations, Chesbrough and Bogers (2014) define open innovation as a “distributed innovation process based on purposively managed knowledge flows across organisational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organisation’s business model”. These flows may include knowledge inflows to or outflows from a focal organisation, or even both (Chesbrough, Bogers, 2014).

2.1.2. Benefits and challenges

Lakemond et al. (2016) describe combining inflows of external knowledge with internally held knowledge as “often an attractive alternative to reliance solely on in-house research and development”. Moreover, these inbound knowledge flows enable companies to spread both the risks and costs related to R&D activities, and provide access to a larger knowledge pool. This significantly increases the chances of successful knowledge recombination. (Clausen et al., 2012; Laursen, 2012; Leiponen, 2012) Similarly, access to a large amount of ideas, knowledge and expertise outside the company (Powell et al., 1996; Laursen and Salter, 2006; Wallin and Krogh, 2010), finding essentially new solutions to solve problems (Lakhani et al., 2006), leveraging complementarities with partners (Dyer and Singh, 1998), helping to shift the traditional perception of R&D away from the internal discovery toward external engagement (West et al., 2014), reducing product development and process improvement costs, accelerating time to market for new products and improving product quality (Wallin and Krogh, 2010) are considered as the benefits for a company engaging in open innovation activities. As an example, Du et al. (2014) found that early stage R&D projects, within a large European electronics company, had greater financial success if they collaborated for external technology knowledge. Piller and West (2014)

argue that "previously undetected technical connections can be recognized" when a company simultaneously engages external experts and reflects on own mental models.

Accenture conducted a survey in 2015 for 1.000 large companies called "Harnessing the Power of Entrepreneurs to Open Innovation". The key findings of the survey are that 97% of the large companies consider digital innovation as "critical to success" and that "collaboration is and will be the engine to accelerate digital innovation". 82% of large companies say they can learn from startups / entrepreneurs about how to become a digital business and 50% think they need to work with entrepreneurs to be sufficiently innovative. Collaboration is also expected to be an essential way to increase digital revenues: collaboration on innovation represents currently 9% of large companies' total revenues and in 2018 this is expected to rise to 12%. As collaboration accelerates the number is expected to be 20% in 2020. (Accenture, 2015)

The top benefits of collaboration from the large company's perspective are summarised in the table below:

Top benefits of collaborating with entrepreneurs on innovation for large companies (ranked within top three)	
Accessing specific skills and talent	53 %
Entering new markets	50 %
Improving return on in-house R&D investments	48 %
Accelerating disruptive innovation in the company	42 %
Designing new products and services	40 %
Enhancing the company's brand / image	39 %
Enhancing the entrepreneurial culture of the company	17 %

Table 1: Benefits of collaboration. Adapted from Accenture (2015).

Wallin and Von Krogh (2010) argue that "not all knowledge and expertise for innovation is most effectively built up within the firm" and describe the principles of open innovation as follows:

- expertise can be found outside a company's boundaries and exported from within
- external R&D can create significant value for the company and the company might profit from it

- building a better business in a market is important, not being the first-mover
- the company that succeeds in making the best use of internally and externally generated ideas generally outcompetes other companies
- intellectual property is an asset that can be traded

However, even if these principles are quite straightforward, for most managers (representing traditional management thinking) it's a serious stretch to adopt them. Embracing the idea of an external source (or external sources) of knowledge often includes adopting a humble and open mindset. (Wallin and Von Krogh, 2010) In addition to renewing the mindset and organisational practices accordingly, also maintaining a large number of connections with different partners can be difficult (Ahuja, 2000). Moreover, many sources can create an attention problem (Laursen and Salter, 2006) and difficulties may occur when choosing and combining between the alternatives (Sapienza et al., 2004). Also, evaluating external rather than internal ideas can often be difficult as there is much less first-hand information available on those external ideas (Menon and Pfeffer, 2003). Thus, a company needs capabilities to work as a "broker" recombining ideas from inside and outside, which may create tensions with other practices within the organisation (Dahlander and Gann, 2010).

2.1.3. Implementing open innovation

Wallin and Von Krogh (2010) argue that open innovation, from a company perspective, is a "matter of selecting the right mechanisms for integrating domain knowledge held by people outside and within firm boundaries". They also found that problem solving is an iterative process with multiple steps of problem formulation and experimentation with different solutions, and that creativity of participants is an important part of it. Felin and Zenger (2014) talk about the importance of governing the different open innovation actions. Accessing external knowledge and fostering open innovation include a variety of alternatives, such as "contests and tournaments, alliances and joint ventures, corporate venture capital, licensing, open source platforms and participation in various development communities" (Felin and Zenger, 2014).

On top of arguing that top-level management need to pay attention to open models of innovation, especially the ones customers are demanding and competitors implementing, Henkel et al. (2014) also point out that the challenges in open innovation might be responded with organisation design: "insights from work on

disruptive innovation may suggest that the right response would be to install a separate organizational unit tasked with this challenge". Piller and West (2014) argue that for a sustained process of collaborative innovation, a company must commit the organisation and dedicate resources for that process, especially related to ongoing interactions with external contributors. Companies often may underestimate the effort needed for the aforementioned activities (Diener and Piller, 2009; Lüttgens et al., 2014) and similarly to Henkel et al. (2014), Dahlander and Gann (2010) argue that these efforts and resources need to be supported by an internal structure (that supports this kind of external collaboration). Also Foss et al. (2011) suggest that firms may be more successful in integrating external input if they have explicit procedures for open innovation.

Cultural aspects and employees' mindset also play a key role when implementing open innovation. Piller and West (2014) argue that knowledge created through collaboration is more likely to be acquired and assimilated when employees are encouraged to use input from externals for their own thinking of new ways. Teece (1996) argued similarly: "If a firm's culture and strategy do not align, it is likely to be unable to implement its strategy, especially strategies which involve innovation." For example, if a company's top management declares that the company will from now on be more open to external ideas, that is unlikely to happen if there is a strong 'not invented here' culture inside the organisation (Teece, 1996).

The scope as well as the rules of collaboration, especially related to intellectual property (IP) and its appropriation, are also critical for successful open innovation actions. Piller and West (2014) underline the importance of the initial scope at the start of the collaboration process to be able to avoid so called "garbage in, garbage out" situation. What comes to the appropriation of IP in dyadic open innovation, companies usually acquire the IP from the external party (e.g. Frenz and Ietto-Gillies, 2009; Jeppesen and Lakhani, 2010). However, other arrangements are necessary when the collaboration context becomes more complex (Piller and West, 2014). Classical examples are open source software communities where companies use a variety of selective openness strategies, as tight control of the outcomes would discourage the participating contributors. In general the companies also engage in recruiting these participants (Piller and West, 2014).

Better innovation outcomes can be achieved with a larger amount of external sources of knowledge (Leiponen and Helfat, 2010; Love et al., 2013). However, other studies

underline the benefits of interacting with specific external contributors, like users and communities (Jeppesen and Frederiksen, 2006). Felin and Zenger (2014) find especially difficult a situation where the manager doesn't know where to start looking for relevant knowledge for solving a specific innovation problem: "Under these circumstances, the manager cannot acquire knowledge, or contract for it, but must instead invite and motivate those possessing it to reveal themselves." One way to tackle the challenge is to work with so called 'open innovation intermediaries'.

2.2. Open innovation intermediaries

This subchapter opens up the role of an open innovation intermediary, that is, a party in between an organisation and external sources of knowledge engaged in open innovation activities. Also the notion of an open innovation accelerator is described more in detail.

2.2.1. Background

So called 'middlemen', who spread knowledge for technical improvements within agriculture, wool and textile industries in the 16th century Great Britain, were among the first known intermediaries for innovation and technology development (Howells, 2006). During the 1980's, intermediary companies' capabilities started to include strategies for technology, manufacturing and time management (in development), on top of the current practice of information brokering. In 1990's intermediaries started to have roles including e.g. collaboration in R&D and creation of new business models. (Lopez-Vega, 2009)

Innovation intermediaries are different kinds of agents performing a variety of tasks for their customers within the innovation process (Diener and Piller, 2009). These agents provide information about potential collaborators, broke transactions in between parties, act as a mediator and help in finding other relevant support for the innovation process (Howells, 2006). Based on the work of Bessant and Rush (1995), Diener and Piller (2009) define an intermediary as an actor specialised "in the articulation and selection of new technology options, in scanning and locating of sources of knowledge, in building linkages between external knowledge providers, and in developing and implementing business and innovation strategies".

2.2.2. Co-operating with intermediaries

Innovation management literature describes different kinds of intermediaries, their activities and how to integrate these activities into a company's innovation process. According to Hargadon and Sutton (1997), the role of intermediaries as facilitators of knowledge transfer between the participants in the innovation process is essential. Diener and Piller (2009) have identified a growing need for intermediaries in bringing more structure to the cross-organisational interactions as well as in creating more transparency. The independent status of intermediaries is taken advantage of by large companies in aim to access precise and relevant knowledge. Co-operating with an intermediary can decrease the development time of a new technology and accelerate the new product development process, thus, intermediaries enhance the companies' own innovation capacity by supplementing the often limited in-house capacity for product innovation. As an intermediary is positioned in the 'middle' and has many knowledge sources within its network, it can provide an efficient and effective search. This kind of operational best practice might be challenging and time consuming for a company to develop internally. (Diener and Piller, 2009)

A company manager has an option to centrally identify relevant knowledge related to a problem and then acquire or hire it. Another option is to choose to broadcast the innovation problem and start inviting those with relevant knowledge to self-identify and provide solution proposals. Especially in situations where the location of relevant knowledge is unknown, this way of broadcasting can enable valuable solutions to reveal themselves. However, companies often have limited capability to broadcast problems to a relevant audience and instead they use formal invitations or requests for proposals for a set of companies that are considered to possess the wanted knowledge. (Felin and Zenger, 2014)

Based on Howells' (2006) identification of different functions intermediaries can perform, Lopez-Vega (2009) divided these functions into three categories: facilitating collaboration, connecting and providing service. Also companies running different kinds of platforms and contests can be seen to provide many similar functions to innovation intermediaries (Felin and Zenger, 2014). Diener and Piller (2009) talk about companies indirectly profiting from intermediaries' economies of scale and scope. Similarly, Felin and Zenger (2014) argue that open innovation (especially contests and community innovation) has benefited from the simple network externalities, i.e. the

network effect. Innovation platforms and contests are central actors that can attract large numbers of potential problem solvers and therefore the critical resource is to discover or develop an optimal platform for broadcasting problems. The platforms' effectiveness depends on the network effect: the benefits for those proposing problems increase as the amount of problem solvers expand, and similarly, the benefits of problem solvers increase as the number of problems (and rewards associated with them) grows. The value of these kind of platforms as vehicles for open innovation increases. (Felin and Zenger, 2014)

The 'absorptive capacity' of a company plays a crucial role in benefiting from co-operating with intermediaries. A company's ability to recognise the value of external information, assimilate it and apply it commercially is critical for the company's capacity to innovate. This ability is called the company's 'absorptive capacity'. (Cohen and Levinthal, 1990) Absorptive capacity enables a company to identify and translate knowledge inflows from intermediaries into actual benefits (Kostopoulos et al., 2011). Lin et al. (2016) suggest that companies should take advantage of intermediaries to widen their external search scope and depth, and that companies' capacity plays a crucial role when absorbed external knowledge leads to actual outcomes. They also underline that "intermediaries only play the role of a complement, rather than a substitute, for internal activities of knowledge management". The research on absorptive capacity in the 2000's (e.g. Cohen, Levinthal, Zahra, George, Todorova and Durisin) argue that absorptive capacity is always built internally at a company. However, technology intermediaries can help building the absorptive capacity within their customer companies via activities such as knowledge intelligence services and knowledge agency and repository functions, thus, absorptive capacity can also exist at an inter-organisational level (Spithoven et al., 2011).

2.2.3. An example classification of intermediaries

Colombo et al. (2015) propose a typology where innovation intermediaries are distinguished based on 1) the way they access their distributed knowledge sources and 2) the way they deliver value to their customers. When these two dimensions are combined, four categories of intermediaries are identified: 'brokers', 'mediators', 'collectors' and 'connectors'. The typology is visualised in the figure below.

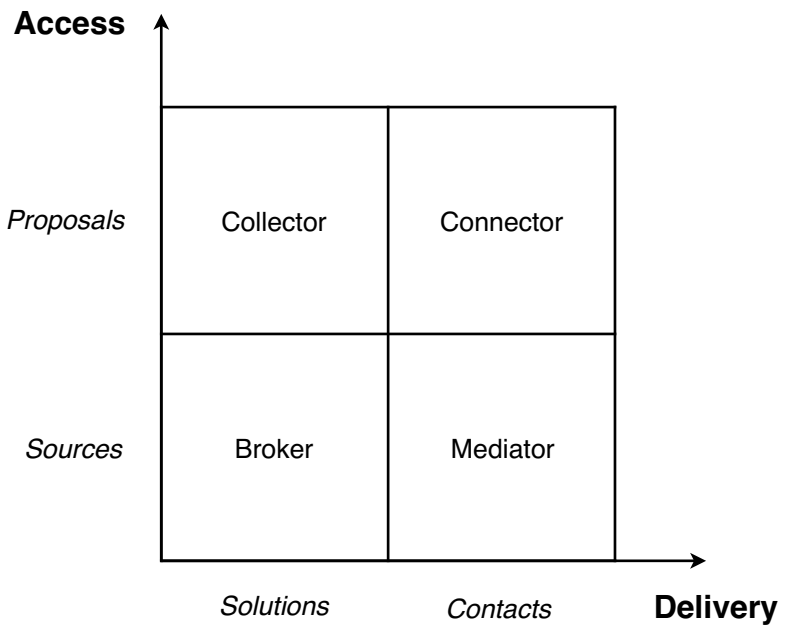

Figure 2: Typology of innovation intermediaries, adapted from Colombo et al. (2015)

Within the access dimension, sources can be interpreted as 'know-who' and proposals as 'know-how' (Colombo et al., 2015). Some innovation intermediaries actively search for the most relevant sources of knowledge (know-who) based on their customers' needs (Hargadon and Sutton, 1997). These intermediaries know exactly who possesses the right knowledge needed to solve the customer's problem at hand (Colombo et al., 2015). On the contrary, other intermediaries, especially the ones operating online, ask their whole community of solvers to submit solution proposals to the given problem (Jeppesen and Lakhani, 2010; Boudreau et al., 2011). These intermediaries don't know exactly who has the right knowledge, instead they are capable to identify and access that knowledge (know-how) via their large network of expertise from various domains (Colombo et al., 2015).

When looking at the delivery dimension, solutions can be interpreted as 'know-how' and contacts as 'know-who' (Colombo et al., 2015). Some innovation intermediaries offer their customers a turnkey solution (know-how) answering their needs (Hargadon and Sutton, 1997; Hargadon, 1998; Jeppesen and Lakhani, 2010). In contrast, other intermediaries create links in between their customers and the sources of knowledge and facilitate the collaboration (Burt, 2004; Obstfeld, 2005; Singh and Fleming, 2010) as well as deliver the contacts (know-who) to their customers helping them to build a relationship with the best knowledge sources (Colombo et al., 2015).

Collectors are intermediaries accessing their network of potential solvers and looking for proposals relevant to their customers' needs, while simultaneously encouraging the network members to deliver these solutions. The solutions are then transferred to the customers for further selections. Similarly, brokers provide their customers with ready-to-use solutions for their innovation processes. However, they don't scout for solution proposals from the whole network, but instead select the sources of knowledge that seem the most relevant for the purpose. Mediators identify appropriate knowledge sources from their network and establishes relationships between them and their customers, i.e. mediators provide their customers with good contacts to address. The last category, connectors, turn to their problem solver network and ask to propose themselves as potential partners to co-operate with the customer. After receiving applications from the solvers, connectors provide them to the customer who chooses the contact(s) for further discussion. (Colombo et al., 2015)

Colombo et al. (2015) also suggest that companies need to develop specific capabilities in order to get the maximum out of the collaboration with intermediaries: working with brokers and mediators requires coordination capabilities, and socialisation skills are needed when co-operating with connectors and mediators. Furthermore, system capabilities are required for successful interaction with collectors and connectors (Colombo et al., 2015).

2.2.4. Open innovation accelerators

Diener and piller (2009) coined the term 'Open Innovation Accelerator' ('OIA'), by identifying a special class of intermediaries who "intend to accelerate the innovation process". These open innovation accelerators provide proprietary methods and tools, access to an existing community of problem solvers as well as process consulting and education for their customers (Chesbrough, 2006; Diener and Piller, 2009; Lopez- Vega, 2009). The OIAs differ regarding what task they're specialised to solve, their software platform and the characteristics of their problem solver community (Diener and Piller, 2013).

The following part of this subchapter is based on Diener's and Piller's (2013) research on the market of open innovation and open innovation accelerators.

Open innovation accelerators can be divided into two categories:

1. The ones who run an open innovation project on behalf of their customers and provide a solution to a given problem.
2. The ones who help their customers to build own open innovation capabilities to be able to engage directly in co-operation with external parties. This group has a stronger focus on educational aspects.

Generally OIAs classify their service offerings in four groups:

1. Open innovation workshops
2. Open innovation contests
3. Search for market information (need)
4. Search for technical information (solution)

These approaches can be further differentiated based on the way the contributors for an open innovation project are selected and how the co-operation is initiated:

- Calling for individuals to identify themselves by contributing
- Searching for relevant information or individuals
- Calling for individuals, but within a pre-defined target group (a hybrid of the two alternatives above)

Idea or solution contests that are based on an open call, are the leading service OIAs offer. When combining both contests for co-creation (idea generation) and technical contests (specific problem solving), they represent 80% of the OIA market. However, 60% of the OIAs offer at least two different services. OIAs are generally knowledge-intensive service businesses, not IT services or self-service online platforms.

What distinguishes OIAs from conventional intermediaries in innovation, from a customer perspective, is twofold. First, software plays a crucial role – in 90% of the cases, OIAs offer a specific software solution. Secondly, community involvement is in the core of every OIA and most of the community members are unknown to the customer, which brings valuable "out of the box" thinking to the mix. Thus, the community composition defines essentially the services OIAs are able to provide. For example, OIAs offering technical search services have access to professional communities, whereas OIAs concentrating on concept generation usually have a wide and heterogeneous community of "regular" consumers. Selecting the right OIA depends on the task and the nature of the problem at hand. A classification of OIAs as well as examples of their activities is presented in the table below.

Mechanism to initiate collaboration	Type of information requested	
	Market information	Technological information
Call	Co-creation contests (e.g. design or ideation) *	Crowdsourcing tournaments / broadcast search / solution contests *
Selective call	Workshops with a pre-selected target group	Workshops with a pre-selected experts
Search	Market research methods (e.g. community observations)	Technology search
	** Collaboration for contests and tournaments can also be initiated by a selective call*	

Table 2: Open innovation approaches and practical examples of OIA activities, adapted from Diener and Piller (2013)

2.3. Experimentation

This subchapter describes hackathons and open data as ways for a company to experiment and explore new opportunities.

A lot of uncertainty is descriptive for unknown markets and new technologies, thus, they require experimentation and risk management within the new product development process. Uncertainty must be reduced by testing different approaches and learning from the results, not by planning. Projects combining a new market and a new technology usually need to be separated from the rest of the organisation. (Loch, 2000) Otherwise they would fall victim to the current operations' efficiency requirements (Burgelman, 1984). According to Chesbrough (2007), the benefits of open innovation are best achieved when a company experiments with its business model (as testing concrete changes gives relevant results), but majority of companies lack this kind of experimentation process.

2.3.1. Hackathons

A hackathon is a problem-focused computer programming event and also a competition where participants develop and present early prototypes of different digital solutions (Topi and Tucker, 2014; Leckart, 2012). Hackathons bring together developers, designers and other talent to intensively collaborate for a short time period on software projects, often to compete for support (e.g. funding) for further development. Hackathons have evolved from "pizza parties" to professional events sponsored by corporations, to regular activities for software companies as well as to opportunities for cultural and public sector organisations to tap into the possibilities of digital innovation. Moreover, they have become a global phenomenon. (Topi and Tucker, 2014)

The term 'hackathon' is a combination of words 'hack' and 'marathon', where 'hack' means exploratory programming (not committing a cybercrime which might be another interpretation). The term appeared in 1999 and apparently originated from open-source software developers. In the 2000's the phenomenon spread as more companies and venture capitalists viewed hackathon as a tool for quickly develop new technologies and find new areas for innovation. Hackathons can be divided into two categories: tech-centric (focusing e.g. on software development of a specific application or with a specific technology) and focus-centric ('applied hackathons' where the scope is defined by e.g. social aspects, demographics or companies). (Briscoe and Mulligan, 2014)

Typically a hackathon lasts from a day to a few (at most) and at its core are the concrete realisations of an innovation, that is, demonstrations which have also been considered from the technical and commercial feasibility point of view. As the speed of development is constantly becoming more essential, hackathon is a promising new approach in software engineering. (Raatikainen et al., 2013) If we look at 'agile' or 'lean' methods, similarly hackathons aim to deliver something quickly and efficiently (Ebert at al., 2012).

Frey and Luks (2016) underline the importance of defining clear goals for a hackathon and taking care of both proper preparations and the followup activities. Top management's support is essential in getting the right people involved from the organisation in all phases of the process. Reasons for a company, to organise a hackathon, can be e.g. collecting fresh ideas, getting feedback on existing ones, creating

a community for open innovation or finding new partners. On top of accelerating the early phases of new product development, hackathons can also help in transforming the company culture into more flexible and agile. (Frey and Luks, 2016)

2.3.2. Open data in private sector

This subchapter is based on one of the first comprehensive studies on open data in private sector by Herala et al. (2016).

Open data discussion is currently mainly focusing on governmental level (Janssen et al., 2012), but private companies are similarly in need of strategies to benefit from data disclosure (Sigit Sayogo et al., 2014). The literature study by Herala et al. (2016) found six positive and four negative impacts on companies from opening their data. In the study a total of 48 articles were read and 466 impacts collected. Majority of these impacts are assumptions: 243 assumed positive impacts vs. 148 negative ones. The number of actual observed positive impacts is 50 vs. 25 negative ones.

The positive impacts consist of
- increasing collaborative actions
- increasing competitiveness
- addition to ecosystem-wide engagement and communications
- enhanced innovation and development
- internal change within company processes and methods
- positive public image

'Increasing collaborative actions' consists of enhanced participation and increased interoperability with academia and other companies, effective receiving of feedback (external input) from consumers and customers, as well as accelerated and more efficient research activities. 'Increasing competitiveness' refers to developing new and more effective business models and processes as well as information methods and business intelligence; change in business environment via stimulating competitiveness, enhancing competitive advantage and exploring new economic opportunities; as well as change in revenue generation through lowered transaction costs, widened company portfolio and added value from augmentation, reuse and combination of data. 'Addition to ecosystem-wide engagement and communication' means community actions (such as increasing activities around the company and its

technologies), benefitting from crowdsourcing, creating change in the ecosystem by increasing transparency and making the communication between stakeholders and companies more reliable, and enhancing performance with external expertise enabling the use of collective intelligence and third-party data processing and validation.

'Enhanced innovation and development' comprises data development (the mix of private and public data, cross-data interactions enabled by easier data movement and technologically independent access to the data), enhanced and increased collective innovation, as well as service development (increased performance and quality of services). 'Internal change within company processes and methods' refers to governance development (cultural changes to welcome opposing views and openness guiding the process of administration), decision making support (decisions can be based on a rich set of opinions making the process transparent and consequences visible), internal change (cost efficiency, boosting productivity, supporting new insight creation and eliminating overlapping data and work) and working environment development (openness becomes a standard procedure, employees are empowered to change their own working and internal criticism can be reduced via easier monitoring and transparent guidance). Finally, 'positive public image' includes improved reputation, brand and public profile through positive visibility and transparent actions, which also enhance trust towards the publisher.

The negative impacts are

- decrease in efficiency
- increasing costs
- problems caused by public access to data
- changes required from the company

'Decrease in efficiency' refers to economic hindrance caused by e.g. uncertainty of outcomes and costs, regulations or lack of use of the data. The company may also lose commercial confidentiality by accidentally publishing critical data. Moreover, the efficiency can be decreased due to legal restrictions (such as licensing and copyrights), lack of technical expertise or lack of interoperability. The collaboration might also be hindered due to mismatched technologies or business models between companies. Also, the preparations and modifications take up time and new resources are needed to maintain the systems. 'Increasing costs' mean the costs of data collection, rendering the data useful (e.g. visualisation), maintaining records and documentations accurate, training stakeholders to the system (related to making use of the data) and other

technological investments. ‘Problems caused by public access to data’ include potential misinterpretations, illegal misuses (such as hacking or data manipulation) and potential threats to the company or especially to individuals. The company opening data may also receive negative publicity and face unwanted questions or confusion about the data, especially if it lacks validity or completeness. ‘Changes required from the company’ comprise both business and internal changes. Closed organisational cultures need change when data is published outside, not just process- or policy-wise but also in the mindsets of employees. Moreover, opening data can make the old business models and sources of value ineffective.

Herala et al. (2016) conclude that there is a need to study more private organisations and their reasons to open, or not to open, their data. Governments are leading the way but only a few companies are following. Although the literature suggests the impacts are positive (as long as the opening is done in a systematic and careful way), companies tend to keep their data closed.

2.4. Summary

The concept of open innovation is generally well-known to companies of all sizes. Bigger traditional companies have started to take steps towards opening up to their surroundings and embracing the opportunities provided by external knowledge sources. Respectively, smaller players have started to benefit from these collaboration possibilities. However, traditional management thinking requires an update towards a more humble and open mindset in order to grasp the full potential of open innovation – the same applies to employees. Moreover, companies need capabilities to maintain multiple external connections, combine ideas both from inside and outside as well as, most likely, redesign parts of their organisation.

To help companies to successfully become more open, so called 'open innovation intermediaries' have emerged, as service providers in between these companies and the external talent, to facilitate and structure the collaboration and knowledge flows. A company's absorptive capacity plays a crucial role in benefiting from co-operation with these intermediaries. Specific intermediaries who intend to accelerate the innovation process are called 'open innovation accelerators'.

Companies can (and should) explore and experiment with the opportunities of open innovation in multiple ways. Hackathons are one way to involve externals and get concrete results in a short period of time. A slightly more "extreme" approach for a company is to open its data publicly. Open data approach has several benefits but it also entails challenges. Public sector has been fairly active in opening data, such as scientific data, governmental data or e.g. weather data, but only a few private organisations have followed the trend. It might be that companies want to take the first step with selective or limited opening rather than providing data publicly.

Tucci et al. (2016) underline that there is less need for descriptive studies on specific open innovation processes or for evaluating whether open innovation is beneficial for a company – instead, more understanding should be built around what motivates or discourages companies to engage in open innovation activities and what factors have an impact on the effectiveness of these activities.

3. Theoretical framework

This chapter describes the theoretical framework used in this thesis. Based on the literature context presented in the previous chapter, the framework used is "a process model for coupled open innovation projects" by Piller and West (2014). The model matches well with the model of Industryhack (see Figure 1 on page 7), thus, the obtained empirical findings reflect the outcomes of the coupled open innovation model applied in practice.

3.1. Coupled model of open innovation

The coupled model of open innovation goes beyond the original inbound (outside-in) and outbound (inside-out) processes described by Chesbrough (2003). Companies using the coupled process combine the inbound process (tapping into external knowledge) with the outbound process (getting ideas to market). To be able to do both, these companies collaborate with other companies in strategic networks. (Gassmann and Enkel, 2004) This kind of joint creation process of knowledge with externals, and structures supporting it, has been researched relatively little in the open innovation literature. The previous research has mostly focused on formal and long-term co-operation, like R&D alliances. (Piller and West, 2014)

The coupled model is divided into four phases: defining, finding participants, collaborating and leveraging. In the 'define' phase the problem addressed by the external collaborators, the resources as well as the strategic commitment is defined. 'Finding participants' consists of searching suitable external partners with relevant knowledge and understanding their motivations. The third phase, 'collaborating', is the key value creation process of the model: interactive co-operation resulting in selecting the most promising ideas to explore further. The final step, 'leveraging', consists of the further exploration, and to succeed in it, companies must get rid of possible structural barriers or 'not-invented-here' attitude within the organisation. (Piller and West, 2014)

Piller and West (2014) apply the model to specific challenges of companies who work with customers, users and other externals, and although the focus is on co-operating with external individuals, they believe the model is also applicable to co-operation with companies or other organisations. This supports the use of this framework in

investigating the results obtained with the Industryhack model. The framework, i.e. the process model, is opened up in the table below.

Process stage	Key activities
Defining	‣ Problem formulation ‣ Institutions and rules (incl. contract and IP terms) ‣ Resource allocation and strategic commitment
Finding participants	‣ Identifying participants with right characteristics ‣ Motivating and retaining a critical mass of collaborators ‣ Selecting the right participants
Collaborating	‣ Governance of the collaboration process (organising, monitoring, policing) ‣ Interaction platform and other tools ‣ Openness of firm attitudes, structure and processes
Leveraging	‣ Integrating external knowledge ‣ Commercialising the knowledge through products and services

Table 3: A process model for coupled open innovation projects, adapted from Piller and West (2014)

According to Piller and West (2014) a critical question related to coupled open innovation is “How can a firm balance the trade-off between revealing too much information in a task on the one hand side, and providing the right detail of input for productive contributions on the other?”

3.2. Impacts of opening data

As a supportive framework, the findings of Herala et al. (2016) from open data in private sector are used. These findings, i.e. the positive and negative impacts on companies from opening their data, are summarised in the table below.

Positive impacts	Negative impacts
‣ Increasing collaborative actions ‣ Increasing competitiveness ‣ Addition to ecosystem-wide engagement and communications ‣ Enhanced innovation and development ‣ Internal change within company processes and methods ‣ Positive public image	‣ Decrease in efficiency ‣ Increasing costs ‣ Problems caused by public access to data ‣ Changes required from the company

Table 4: Impacts on companies opening their data, adapted from Herala et al. (2016)

4. Methodology

This chapter describes the methodology used in this thesis. Firstly, the research objective and the research question are presented, then the research design and case study method are described and finally the data collection and analysis are discussed together with case companies and interviewees.

4.1. Research objective

This thesis aims to reveal why large industrial companies take part in open innovation activities, more precisely in experimenting with a model provided by an open innovation accelerator called Industryhack, and what have been the concrete outcomes of such activities. Simultaneously, the challenges limiting or hindering the experimentation experience are investigated. The theoretical framework used is the process model for coupled open innovation projects (Piller and West, 2014) and the results reflect the outcomes of using such model in practice. Empirical findings are gathered by interviewing representatives from the case companies, mainly from higher management level. To guide the research, one research question was formulated:

What are the motivations, benefits, challenges and concrete results of the Industryhack co-development process from the host company perspective?

The following hypothesis was formulated based on the research question: *The Industryhack co-development process provides the host company with innovative proof-of-concepts in a relatively short time period. The most promising POCs are ready to be piloted both time and cost efficiently with the respective teams to validate their viability in the business environment, which is seen as the main benefit. These pilots also represent the concrete results. Additional benefits are related to company culture development as well as marketing and PR. The motivations are strongly related to all of the aforementioned benefits. The main challenges consist of the quality of the teams and their POCs, allocated resources (time and money invested), adapting to the more agile way of product development and opening up business sensitive data to externals.*

4.2. Research design

Open innovation is quite extensively researched in the literature, although being a relatively new phenomenon. However, not much is written about the benefits motivating and challenges discouraging a company to engage in collaborative activities. Moreover, concrete experimentation, such as opening data (publicly or selectively), getting involved in challenge-driven open innovation or using a hackathon as a tool for kickstarting co-operation with externals, are very new to academic research. As Piller and West (2014) argue, there is "little knowledge on what happens inside the firm that helps or hurts a firm's ability to profit from coupled open innovation". Moreover, Dahlaner and Gann (2010) state "there may be new ways to work with external actors, suggesting qualitative change of practices", and that external knowledge is considered to exist "out there" but the understanding is limited on how companies harness it.

Qualitative methodology was selected for this study. Compared to quantitative research, qualitative research enables a more in-depth look on the studied issue and it can also be used in small-scale studies. In qualitative research, the focus is on subjects, such as people's values, understandings, environment, interactions with others and reality in general. Selecting a methodology in research should be done in relation to the knowledge gathered, resources available and personal preferences of the researcher. (Silverman, 2005) The qualitative methodology was chosen here because of the lack of research related to the focus of this study, thus, there was a clear need for deeper knowledge that would contribute to the open innovation and open innovation intermediary literature. Qualitative approach is also useful for investigating phenomena in their natural environments (Gephardt, 2004). Moreover, the resources of this thesis were very limited.

The main research method used in this thesis is the case study method. Eisenhardt (1989) states that case study research uses empirical evidence from real-life cases to create new theory. Using of cases and theory building, instead of theory testing, needs to be justified by a gap in existing knowledge (Eisenhardt and Graebner, 2007). As mentioned earlier, this gap does exist in the open innovation literature. A case study doesn't require a strict theoretical background and the research question(s) can evolve during the study. The case study of this thesis consists of eight large Finnish industrial companies.

4.3. Data collection

This subchapter describes the case companies and their representatives (interviewees) in a general level, how they were selected and interviewed, as well as how the empirical findings were collected.

4.3.1. Case companies

This study was conducted as a case study with eight case companies. The scope of the study was set to investigate the impact of Industryhack as an open innovation accelerator. Respectively, the selected case companies needed to be or have been working with Industryhack. All of Industryhack's customers at the time of the study were listed, and the sample of 8 was selected with two criteria: the amount of companies in the sample has to be big enough (to get enough data for a valid study) and the sample should represent a variety of industries. Two of the interviewees were acquaintances of the researcher and the rest were either approached directly or via an introduction from Industryhack CEO. The researcher was also employed by Industryhack by the time of the study which helped with the interview process.

The case companies represent different industries, such as heavy machinery, recycling, energy and maritime. All of the case companies will remain anonymous. This is agreed between the researcher and the interviewees. Moreover, there is a non-disclosure agreement (NDA) between Industryhack and each of its customers. Some general information of the case companies is presented in the table below.

Average revenue (millions of euros, 2015)	2052
Median revenue (millions of euros, 2015)	1023
Average number of employees (2015)	12200
Median number of employees (2015)	8500
Number of countries operating in	1 – 100+

Table 5: Revenue, employee and country data of the case companies

4.3.2. Theme interview method, interviewees and interview structure

To gather the empirical findings, semi-structured interviews are used – more specifically, the theme interview method. The theme interview is a specific version of the semi-structured interview, where the interview is divided into predefined themes (Hirsjärvi and Hurme, 2006). These themes provide the only structure for the interview, otherwise the discussion can flow freely. In this research, the questions are divided into five themes: 1. Background & preparations, 2. On-site event / hackathon, 3. Followup activities, 4. The whole innovation challenge and 5. About open innovation. The first three themes focus on the "pre", "during" and "after" phases of the intensive co-development days, i.e. the hackathon event. The last two themes focus on grasping a holistic view on the case company's experience with both Industryhack and open innovation in a more general level. If the study is explorative, the sample size small and the gathering of empirical findings happens by interviews, open-ended questions should be applied (Silverman, 2005). This leaves space to move with the interviewee and focus on the most relevant topics during the interview.

In total of nine people, from management level, were interviewed from the eight case companies to gather the research data. Seven of the interviews were conducted in April–May 2016. Five of the interviewees also provided a concise update on the follow-up activities in February 2017 via e-mail. One of the interviews took place in March 2017. The innovation challenge themes of the case companies varied along the company and industry, some examples being data collection from production, transferring a company's design philosophy to Internet of Things, enhanced information flows with suppliers, more efficient maintenance operations and better safety at sea. The innovation challenges took place in 2015–2016. The average number of external teams who participated in the experimentation with a host company was 12,6. The companies have randomly been given an identification number between 1 and 8 and are from now on referred as "Company X" where X is the respective identification number. The interviewees' roles at the case companies are presented in the Table 6.

Case company	Role of the interviewee
Company 1	Process and Training Owner
Company 1	Chief Digital Officer
Company 2	Manager, Digi team
Company 3	Director, Cargo Services
Company 4	Creative Director
Company 5	Director, New Business Concepts
Company 6	Development Manager, Digitalisation
Company 7	Vice President, Digitalisation (previously Senior Research Engineer at Company 1)
Company 8	CEO

Table 6: Roles of the interviewees within the company

The theme interview questions and structure can be found from the appendices. The interviews were audio recorded and conducted alone by the researcher. Notes were written during the interviews and complemented by listening the recordings. The notes are not attached to this thesis as they would reveal confidential information about the interviewees and their companies. However, the compiled findings (anonymised) are part of the appendices.

4.4. Data analysis

To analyse the empirical findings, the cross-case analysis approach is used. Miles and Huberman (1994) present the cross-case analysis as a method to synthesise findings from multiple cases within a multi-case setting. Their method consists of three steps: data reduction, data display and conclusion drawing / verification. In this research, each analysed case represents a company who has organised an innovation challenge with Industryhack. In the core of the analysis is to provide findings by first analysing each case company separately and then providing results by combining the eight cases together. The term “cross-case analysis” can even be considered as an umbrella term for analysing two or more cases to produce a synthesised outcome (Khan and VanWynsberghe, 2008).

For each case, a table is constructed and the respective interview data is mapped into the table within five categories: Motivation for collaboration, Background in open

innovation, Benefits from experimentation & future benefits, Challenges in experimentation & future challenges and Other findings (see Appendix 2). The interview recordings and notes are used to fill in the data to the table. After analysing all of the cases, the findings are gathered together in three separate tables: motivation for collaboration & background in open innovation activities, benefits from experimentation & challenges in experimentation, and concrete results (see Chapter 5). Using e.g. matrices and tables helps in comparing the cases (Cruzes et al., 2015). In Miles and Huberman's (1994) classification of cross-case clustering, the variable-oriented approach, which is used in this research, underlines the variables identified in the cases, that is, the themes and patterns that cut across the cases.

Due to the fact that very little research exist about the experiences and results related to companies using the coupled open innovation process (by Piller and West (2014)), the analysis of this study can only apply the selected theoretical frameworks as follows: the coupled open innovation process reflects the model of Industryhack (that the case companies use to obtain results), and the benefits and challenges of using such model are compared against the findings of Herala et al. (2016) in their research on open data in private sector.

The results are presented in detail in the following chapter (Chapter 5). However, the concrete results, also emphasised in the title of this thesis, can only be represented on a generic level, as the actual products (although being public) can be directly connected to the respective case companies and the ongoing pilot projects are confidential by nature. The research question is answered and the hypothesis evaluated in Chapter 6.

5. Empirical findings

The aim of this research is to understand large companies' motivations to use an open innovation accelerator (in this case Industryhack) and the benefits they experience, as well as to reveal the underlying challenges that may hinder this kind of collaboration. In addition, the background in open innovation activities, i.e. 'readiness' to collaborate with external teams, is investigated.

5.1. Motivation for collaboration

"In Finland, there is a tendency to hold seminars and talk. That is hard to implement into own product and daily work."

– CEO at Company 8

This subchapter describes the different motivations of the case companies to engage in experimental collaboration with external teams through the Industryhack model. The findings are categorised into three themes: testing & experimentation; talent, resources & ecosystem building; and being on board of digitalisation & mindset shift.

Testing & experimentation

The common motivation of each of the case companies was to see what could be achieved in 2–3 days, together with teams who came from outside of the industry and brought in completely new points of view. Witnessing how the teams worked, discussing about the ideas they came up with, being part of the creation process and seeing the final POC demos was considered motivating. Company 1 was also interested in seeing what could be done with the APIs they had developed. For Company 5 this was a way to continue testing their APIs. Company 7 thinks open innovation provides interesting opportunities: "It's all about ways to do things faster, better and more efficiently." Company 8 saw the Industryhack approach as a fresh and new way of collaborating – for them it was easy to grasp and start doing.

Talent, resources & ecosystem building

Company 1 thinks it's important to have a community to collaborate with. They are building a network of companies and peers to better understand together the opportunities of industrial internet. They also support and encourage startups and smaller companies to get involved, which would bring value for the whole ecosystem. Company 1 admits they cannot be the best innovator in all areas, neither can they have own resources in all areas. For Company 5 this is a way to look for collaboration opportunities with startups. Company 7 has ecosystem thinking in their strategy, as they're currently transforming from a product and service house into a solution house. They have also understood that this transformation cannot be done alone – an ecosystem is needed, and they also actively communicate about it. Activities, such as Industryhack innovation challenge, is a way for Company 7 to build that ecosystem. Company 8 felt the digital development in general was advancing heavily, and they wanted to "see what the group had to offer in practice". They also have "ecosystem building" written in their strategy.

Being on board of digitalisation & mindset shift

Company 2 has had digitalisation as part of their strategy since 2014. On their opinion there is no industry that wouldn't be affected by it – "either you are aboard or out of the game". They have recently created a separate internal team focusing on new digital service development and digital business. One of their first thoughts was a hackathon and Industryhack was shortlisted as a partner because they considered it as "spot on". Company 5 heard positive feedback from a fellow company who had previously worked with Industryhack, which gave them a push towards trying out this new way of solving their digitalisation challenges.

Company 8 noticed that digitalisation started to move to the next level: people became more aware about the phenomenon and e.g. Company 1 was already collaborating with Industryhack at that time. Company 8 started to think what digitalisation could mean in practice for them in the long run. They had already worked on these themes, e.g. information system development, for some time, but the above mentioned advancements as well as factors, such as sensor technology development, pushed them to action.

Company 3 was unhappy with their IT department: the development stalled and followed old patterns. They were in need of sparring – something that would open their own organisation's eyes. With a long history in a specific industry, a certain "this is how things should work" mindset can easily be established. As an example, the company's director mentions he has tried many times to get different projects forward, but the response has always been "yeah, costs 500 000 euros and takes 2 years" or something similar, which might have led to missing many potential opportunities. That is why they wanted to invite some 40 minds, who were thinking out-of-the-box, to bring fresh thinking to the conservative world where often people and organisations are imprisoned by their own brains.

5.2. Background in open innovation activities

There are many ways for a company to exercise open innovation in practice. Industryhack provides one of these ways but the case companies have also engaged in various other open innovation activities. These activities are divided into four categories: open idea funnel & contests; new ways of working, organisational changes & intrapreneurship; using consultants & co-operation with students; and openness & breaking silos. Only one of the companies considered Industryhack as their only actual partner in open innovation.

Company 7 states two reasons for "a wide range of activities". Firstly, they see open innovation as a very dynamic field which constantly evolves – one has to be interested in seeing what kind of tools are developed and what kind of things start gaining momentum, thus, it might not be wise to limit one's opportunities by only selecting 1–2 activities to focus on. Secondly, Company 7 operates quite widely, as it has three business areas with own individual companies – the selection of open innovation activities also needs to be wide. Their take on open innovation is summarised as follows: "A corporation can create a good foundation and help its businesses to succeed by supporting open innovation activities, events and projects, which enable the businesses to renew, develop and become more efficient. However, it can't and shouldn't act as a besserwisser."

Open idea funnel & contests

Company 1 hosts innovation contests with prizes on a yearly basis. Also the person moving the idea or concept forward gets rewarded. In addition, Company 1 has an e-mail address which works as an open idea forum for employees: ideas sent to that address show up on a live feed on an internal web page for further discussion. Company 3 also has an internal ideation system with prizes. However, often the starting point is improvement and better efficiency, not so much about building something completely new. Similarly, Company 6 has an own idea platform with the theme "from idea to business". The funnel is fully open from the beginning, anything can be suggested by any employee, and it has three phases: idea generation, idea screening and idea development. These ideas are generally divided into three categories: 1) ideas from R&D department, 2) ideas from employees (the "initiative box") and 3) strategy driven ideas which are responses to the management's specific questions on the intranet. Concise feedback is given to every idea and its submitter. The idea process also works as a "parking lot" – in case a formulated and discussed idea doesn't go forward, it is put in the stack on the platform to wait for potential future use.

Company 5 launched its first "API Challenge" in 2013, which aimed to reveal what people would develop if these interfaces were opened. This led to better understanding of what kind of APIs the developer community were hoping for. On top of these API Challenges, Company 5 also has "Open Calls". Through Open Call 2016 approximately 10 companies were taken into business discussions – some have gone forward slowly and some faster, as Company 5 is constantly looking for the right collaboration model with each of these companies.

New ways of working, organisational changes & intrapreneurship

Company 1 sees industrial internet as a strategic initiative that includes not just new technology but also experimenting with new ways of working. Company 2 has created a separate and rather autonomous unit within its organisation: a 'digi team'. One member of this three-person team was recruited from outside of the company. It also has execution ability with access to centralised resources from IT department. The digi team is a "platform for experiment" focusing on digitalised services with a direct connection to customers. When a good idea or concept is found, no matter where it comes from, it is first assigned to an owner who drives it forward. Then the digi team

gets involved and helps the owner in the process with lean methods. In a way, the team is like an "overtaking line" for ideas and concepts, as no questions need to be asked. It has an own budget, and the only green light needed for a case to proceed comes from a digi-executive group. The digi team has the permission to fail, as its purpose is to experiment. Also, the team is a temporary structure and the need for it is re-evaluated in 2018 – if its activities are well implemented into other parts of the organisation it might no longer be needed.

Company 4 has recently started open innovation activities under the term "new business models", which means they e.g. look at services and portfolio development with the aim to find the next trends to get involved in. Company 7 has internal startups, thus, it supports intrapreneurial activities. It also has an "Innovation fund" and processes to get things forward, despite the yearly budgeting cycle traditionally used with development projects. Sometimes they also use external help with these accelerated projects. Company 7 has applied agile methods to their software and digital offering development.

Collaborating with Industryhack has been a big step for Company 8, as they don't do open innovation otherwise – it has been a good experiment about the paradigm according to them. They do also have a network of other companies and partners to explore digitalisation with, but they consider Industryhack as the way for them to do open innovation. They are not eager to "open everything up and start to take in as much ideas as possible", not just because they don't have enough resources for it, but mainly because "that would turn against itself" – they think it's important to get things actually done based on the ideas before taking new ones in.

Using consultants & co-operation with students

Company 1 is engaged in university and student co-operation via Demola initiative, which is an international organisation facilitating co-creation projects between university students and companies. Company 7 also actively collaborates with universities. Other forms of external help are e.g. consultants, used by Company 3, Company 6 and Company 7, and studios or agencies, used by Company 4. Company 6 experiments with workshops also internally, which provide "good starts". It has a vast amount of ideas in reserve as "tens of flip charts have been photographed", but in order to make them move forward, they need to be taken into concrete parameters, e.g. figure out what is needed from supplier and/or technology side. The challenges occur when

it's time to define how to execute some of these ideas and actually start doing. It often becomes something "someone" or "R&D" will take care of, thus, employees might not be that enthusiastic of taking ownership of these ideas.

Openness & breaking silos

Company 1 is not building proprietary platforms or closed environments but instead open APIs and general platforms to enhance collaboration. Company 3 is regularly approached by companies with ideas they'd like to talk about, and it has created an internal methodology defining how these approaches are dealt with. Company 5 actively promotes startup collaboration and quite a lot of startups approach the company themselves.

Company 7 focuses on community building in the digitalisation field. With a two-person team they enable things to happen. They do not aim to lead the whole innovation in the company or tell what should be done, but instead they act as enablers and show example by providing new ways of working and thinking. For example, by organising a hackathon they can concretely show what this kind of collaboration enables for the company. In this case, it made people meet new companies, parties and people, such as developer candidates. It showed a new way of doing things – it's then about the business units to pick the ways suiting them the best. The team's aim is to reveal ways to go forward, ways for renewal and ways to do differently. Company 7 also co-operates with other big companies from the industry to be able to investigate industry specific areas further.

Company 8 has a culture that supports curiosity and these kind of new projects, even if their focus is on building machines – this kind of flexibility is expected from their employees. They think it is important to be open for new things, that the first response to a new proposal is not "no" or "we know what we're doing" – that kind of attitude has never brought anything good according to them. Company 8 also gets a lot of inbound ideas from their service operations and customers.

5.3. Benefits from experimentation

"Good experience"

– Senior Research Engineer at Company 1

"Great stuff"

– Creative Director at Company 4

"A great chance to get positively surprised"

– Development Manager at Company 6

"The atmosphere was terrific"

– CEO at Company 8

All of the case companies seem to have had a positive experience with Industryhack. Generally, when companies talk in public about hackathons or innovation challenges they've organised or otherwise been involved in, themes such as "interesting people", "energy", "buzz" and "great ideas" are often pointed out. The most interesting, however, is to see what are the experienced concrete benefits that lay behind all of these enthusiastic words.

"Industryhack allows us to grasp quite well the whole view on digitalisation in the context of our own products"

– CEO at Company 8

The case companies have experienced multiple benefits from experimentation and collaboration with external teams. These findings are divided into seven categories: talent network, ideas & POCs, business discussions, pilot projects & new products, culture development & speed, marketing & PR, and other benefits.

Talent network

Participating teams represent the talent the host companies experiment different solutions with. That group of people, also representing their companies or employers, is considered beneficial as it a) is sought for the host company and physically brought to their premises, b) raises the host's awareness of the different skills and offerings

available in the market and c) represents potential partners to start further collaboration with (in practice immediately).

Company 1 estimates their ability to reach the right people is not very good compared to Industryhack "who has better links, which is valuable for us". After the innovation challenge, Company 1 says they know a lot of companies and talent (and what they can do) from relevant fields. Similarly, Company 2 thinks a lot of workload was taken away from them, as the searching and finding of the participating teams was done by Industryhack. Company 6 was very happy about the professionalism of the teams.

Engaging with potential partners is a key benefit for many. Company 5 wants to work with startups and this was a concrete way to show what that work could mean in practice. The experimentation enabled Company 6 to meet with competent individuals and companies, both potential supplier and partner candidates. For Company 7 this was a way to show to existing and potential partner companies that they're open to this kind of working model. Company 8 also finds the network perspective, and seeing what kind of players and people there are, very important as "it's all about people – you get to see how people work, how innovative they are and what they get done".

Ecosystem building also stood out as a benefit. Company 1 thinks "Industryhack's method is a good foundation for developing the ecosystem." Similarly for Company 7 this was a strong start for building the ecosystem, not just talking about it but actually executing – the company did not just engage in a weekend-long excitement, instead this acted as a starting point for further collaboration. Company 8 thinks that building an ecosystem around the product development, especially now when technology is developing so fast, has a tremendous significance. They see what is happening both in operations and technology through their existing network and own product knowledge, but when "going outside and taking, let's say, artificial intelligence – what could that give to our company?" They see that hackathons can answer to this kind of problematics and provide a huge opportunity to grasp the wider point of view.

In addition, two case companies mention recruitment opportunities: Company 7 is looking for software development talent and used the collaboration as a tool to enhance employer image, and Company 1 ended up hiring one participant with user interface development skills after their innovation challenge.

Ideas & POCs

One of the main motivations of the case companies was to see what could be achieved with this experimentation: what kind of ideas are born and which ones of them are refined to POCs. This is also experienced as one of the key benefits.

Company 1 uses these ideas in product development and thinks "the results surprised positively". Different thoughts, ideas and initial product and service concepts are considered as good and beneficial also by Company 3, Company 4 and Company 7. Company 2 liked that they could test so many different concepts in a short time period. Company 1 started internal follow-up projects within voice recognition, a technology tested during their innovation challenge. They introduced a new product using this technology in summer 2016.

The POCs represent another core benefit. Company 1 thinks many of the POCs weren't ready to launch in, or directly apply to, an industrial context, but "several of them could be developed into full-blown products with a bit of fine tuning and additional integration". Company 2 considers the ideating and solution demonstrating as prototyping of concrete products and services. Company 4 was very happy with the different POCs and Company 3 thinks "more than half were brilliant material". Similarly Company 5 mentioned "concrete POCs to be taken forward" as a main benefit. Table 7 shows the number of POCs developed in each innovation challenge.

	Number of POCs
Company 1	16 + 12 *
Company 2	14
Company 3	14
Company 4	11
Company 5	14
Company 6	13
Company 7	10
Company 8	11 + 11 *

Table 7: Number of POCs developed during an innovation challenge (matches the number of teams)
** Companies 1 and 8 have organised an innovation challenge twice*

New perspectives, or "out-of-the-box thinking", is regarded as beneficial. Company 2 values that the external teams consist of "people who really look from outside of the industry". Company 8 says they benefit from predisposing themselves to the opportunities of product technology development. Similarly, Company 6 appreciates that the new approaches and ways of execution have no limits, as they don't go through the "internal tube". For Company 4, it has been important to realise that the default problems within the industry are not that essential anymore, as you can actually stretch the point of view much more.

Some concepts also stand the test of time. Company 4 thinks "object communication will be relevant for long – we're not necessarily in a hurry", and Company 6 has many of the ideas "on stack" that they constantly go through for potential further development.

Business discussions

"Business discussions" refer to follow-up negotiations about a pilot project, between a host company and a team who has presented a proof-of-concept demo. The discussions start when a team has handed in their pilot project proposal. Seven out of the eight case companies had business discussions with participating teams after the innovation challenge.

These discussions are a necessary phase between obtaining the POC results and putting these results into practice and further testing in real business environment. The phase also concretises to the host company what can be achieved with a more agile development cycle, both time and money-wise – a pilot project's scope in this context is usually limited to a duration of a couple of months and to a cost of roughly 20–30.000 euros.

Company 1 continued to business discussions with four teams after their first innovation challenge and three teams after the second one, Company 2 with four, Company 3 with eight, Company 5 with seven (their own estimate), Company 6 with six (their own estimate), Company 7 with "multiple teams", and Company 8 with three teams after their first innovation challenge and five teams after the second one. Company 4 didn't proceed to business discussions with any of the participating teams.

The time used in discussions vary case-by-case and eventually the dialogue might end or get postponed. “If a team doesn’t hear from us within six months, it doesn’t mean we are not interested” says Company 3 who gets back to the pilot proposals and POCs when other projects free necessary resources. They will then ask specific teams if they wish to present the concept’s current status. Industryhack aims to shorten the negotiation time and has recently updated the policy for decision making: the host company should select the pilot project(s) it wishes to further advance within a month after the POC demos have been presented.

Both hosts and teams have different approaches to discuss about potential further collaboration. Company 5 selected three teams, which they directed to pitch to the executive group, and already had made a “mental decision” to proceed with one of the teams. They believe that “a couple of teams are taken at least some steps forward” and estimate the cost for the first piloting step to be roughly 20–25.000 euros. One of the teams who continued discussions with Company 3 changed its members for the negotiations. This “new” group of four coders straightforwardly explained what can be done and what can’t – given the current context and constraints. Their honesty and expertise established trust and was appreciated by Company 3 who said “most likely we will do business together”.

Various reasons may cause the negotiations to end and not lead to piloting. For example, one team with an own platform looked for a logistics and access-to-market partner from Company 2, but it conflicted with Company 2’s already ongoing pilot project. For Company 3, one of the pilot proposals was slightly too broad and costly, although the POC in discussion was considered good. One of the main reasons for discussions not to lead to pilot projects is simply the lack of host companies’ resources due to other priorities. E.g. Company 7 has been having multiple discussions, some of which are finished, but no new pilot projects have started yet – “things will eventually go forward with these teams”. More of these themes are discussed in subchapter 5.5. (Challenges in experimentation). Some promising outcomes have emerged from these discussions, as described in the following subchapter.

Pilot projects & new products

Pilot projects result from successful business discussions between teams and host companies who decide to continue further experimentation together. In the best case scenario, these pilots and their results lead to further product development projects and finally to actual new products.

Company 1 started a pilot project, after their first innovation challenge, together with a merger of three teams – one bringing in the concept, another the embedded software and the third the application development. This pilot happened in a form of a research project and it was very rapidly executed, lasting only 3–4 weeks, which also included the contract negotiations with the teams. The end result was a working prototype that was presented for the management in the host company's internal conference. Another pilot, although an internal one, took place in the factory of Company 1 – the preparations for the innovation challenge and especially the on-site hackathon served as a basis also for internal follow-up projects.

One team, during the Company 1's second innovation challenge, came up with an idea they started to develop further themselves afterwards. The team's company productised the concept and now sell it to the industry. They're also in discussions with Company 1, as the product is seen as a good fit: "It could well be an additional solution for us to sell with our products and services."

Company 2 had a prerequisite that at least one concept is found, taken forward and made into reality. This happened: one team's concept was decided to be taken forward already during the hackathon. The pilot consisted of light business case modelling and building the minimum viable product (MVP). After the pilot, the MVP was developed into an actual product, in this case a service. Company 2 ordered the work in pieces from the team, and also other people from the team's company were involved. According to Company 2, their lean culture and internal 'digi team' made the building of this service possible. The return on investment (ROI) became positive approximately 7 months after the initial piloting steps. "It has been proven that the service is good and it is generating revenue. This actually is a good case – not just something that was done but led nowhere. The service is constantly growing and has potential to become much more than what it is now."

Company 3 has ongoing piloting with one team. Similarly, Company 5 is piloting with one team (together with a customer). They also did further POC-development, one could say "pre-pilots", with two teams, and are currently discussing about further steps based on these results. Company 6 started a slightly larger pilot project with one team, but a competitor came to market at the same time with a similar solution. They had to decide whether they want to put a significant amount of money to something to be second in the market with, or not. As a consequence, the project was put on hold and they're still looking for the right angle.

After their first innovation challenge, Company 8 went forward with three teams and did further POC development. They also budgeted a larger pilot project for each of the teams. Two of these pilots are ongoing in spring 2017, the first one ending in the summer. Company 8 has also started a pilot with a team from the second innovation challenge. CEO of Company 8 thinks it's "great that one POC [from the second challenge] has moved forward and is already piloted and tested".

Culture development & speed

Many of the case companies experienced benefits related to their company culture development, such as employee mindset shifting and more effective internal collaboration. One of the essential aspects is also the pace the experimenting brings into the company – development is fast, and tangible results can be seen in a relatively short period of time.

For Company 1, it was eye-opening to witness how the outsiders worked and collaborated with their employees. New perspectives and the realisation that things can be done fast but effectively, caused a culture shock for many. The experimentation activated people from different parts of the organisation, such as research, product development, different business units and IT, which strengthened the information flows and internal collaboration. In addition, the collaboration raised the atmosphere and sense of togetherness significantly, which had a positive impact on the internal culture change. It helped in "sucking the agile development mindset into the house" and also in raising the openness of product development, which has now sticked to their company culture.

Very similar outcomes were experienced by Company 2, Company 4 and Company 5. According to Company 2, this "helped a lot in internal culture change, also after the

innovation challenge". Roughly 30 of their employees visited the premises during the hackathon, and bringing people in was very easy. Company 4 says this empowered employees, who don't have "innovation" or "strategy" written in their title, to get involved – "strategy is for everybody". This was something open for the whole staff to take part in, and people still talk about it inside the company. For Company 5, this was a tool for internal culture change, building and development. In practice, this means better collaboration and breaking of silos. At first people were working from their own foxholes, but in the end, the co-operation was very natural towards a common goal. "A lot of these elements will nurture the organisation in the long run." As a key takeaway, Company 5 underlines the importance of making your own organisation do things together, and bringing in some startup mindset – "many companies have hard times currently because of doing that old long development process".

"What had been thought for 3 years and developed for half a year, was now done in two days by outsiders. Our clock speed can be raised significantly."

– Senior Research Engineer at Company 1

Company 1's key learning is related to the development speed. They experience that the collaboration with Industryhack accelerates their innovation process as a whole, which has a big impact on renewing the whole company. Company 2 summarises that Industryhack speeded up the digitalisation of their plant. One of Company 4's designers was very impressed by the speed, as it only took three days of development to make a working prototype.

Marketing & PR

The innovation challenge, and especially the physical co-development phase, seems to provide interesting marketing and PR content for the case companies.

Company 1 actively communicates about the collaboration with e.g. videos explaining why they think it's important to explore the possibilities of open innovation and new technologies within their industry. Company 2 had small resources related to marketing and PR activities, but they still gained significant benefits, which started to show immediately. Many had noticed that they organised an innovation challenge, and some even referred to Company 2 as "the innovative company doing digital services" based on what they had seen.

Company 4 also received good feedback from people who had noticed their activities within practical open innovation. To support this good PR, whenever invited to give a talk, they also show photos of the hackathon as an example to tell what happens in the company. Similarly, Company 5 has benefitted from media visibility and Company 7 from positive PR.

Other benefits

Some of the case companies have experienced other benefits as well. Four themes rose from the data gathered: feedback, concreteness, business environment development and neutrality.

Feedback: The teams helped Company 1 to develop their API and capabilities to work with external developers. The teams also gave other relevant feedback and asked essential questions. Company 2 got good feedback about their data, especially related to how beneficial and usable it is. They received development ideas for the future.

Concreteness: For Company 8, this very concrete way of doing provides essentially two benefits: 1) the bigger whole starts to emerge – understanding what can be achieved with the latest technologies and 2) own people start to see opportunities – "That's a big thing. It is so concrete." Moreover, the concreteness makes it possible to obtain actual results, such as pilots. Company 8 thinks the practical approach brings a lot of value, as they got to map in a flexible way what the external companies and people actually had to offer.

Business environment development: Company 1 sees the longer term benefits that help the bigger whole. As one of the first-movers using an innovation challenge (and a hackathon) as a tool for open innovation, Company 1 took part in creating a big impact on the general discussion in Finland. They were aboard showing example on how this kind of collaboration can be done and how one can benefit from it, which had an impact on the existence of these kind of activities – activities that have now become more or less modus operandi. The discussion has now switched towards an "ecosystem model" of operating, where concepts are built and experimented, people and companies get connected, and hosts, participants as well as third parties (such as technology partners) benefit from the collaboration.

Neutrality: Company 1 thinks "Industryhack provides a neutral environment for the developers to come in", which is seen as better than if individual companies invited these people.

Committing to the collaboration also puts positive pressure on getting things done. E.g. Company 8 had talked about building APIs for long, but the actual doing started when a schedule with a deadline appeared. "The interfaces were done, as there was no choice but to get them to work – otherwise it would have most likely been pushed to the future."

5.3.1. Future benefits

Six out of the eight case companies also mentioned benefits that the experimentation and collaboration could bring in the future.

Information technology (IT) is the biggest growing part of Company 1's business – "the more new improving ideas, the more the company moves forward". They are also curious in seeing what could be achieved during a longer period of cooperation, when e.g. opening up their business model and letting people play with it. Moreover, they're interested in adopting this more agile working model (fast paced short projects) to the whole organisation.

Company 3 thinks the eye-opening aspect of the collaboration, which was now experienced by their IT department, will be strong also in the future. "A lot can be achieved in just two days, when there is will end energy." For Company 6, their idea and team pipeline built around the innovation challenge outcomes represent future opportunities – "it's good to know these people".

Company 4 is thinking of organising another innovation challenge, involving customers and focusing on concrete outcomes to advance with the teams afterwards. They feel that a "future innovation team" is hard either to found internally or to outsource to e.g. an agency – "Could Industryhack take role in that?"

The ecosystem model is "sold well" internally within Company 5, and they consider the innovation challenge as a great tool for linking internal and external innovation. They will organise another challenge abroad next and are also planning to explore

more the opportunities of hardware focused R&D in this context. Similarly, Company 8 sees the ecosystem as the future key benefit: “That is a clear thing. The pilots and projects start from there, the added value comes from there.”

Company 8 will submit itself to more innovation challenges and sees a continuum of them in the future. Continuous experimentation is essential for the company, as they want to keep on testing and learning. “We'll use this concept to make sure our longer term strategy and vision come true, but also to think of new directions and to develop our vision forward.”

Company 8 summarises their thoughts about the model: “If Industryhack gets the ecosystem to work well and people to know it and used to it, it provides an opportunity to get results even more intensively, as the network keeps on growing.”

5.4. Challenges in experimentation

As with everything new, and especially when talking about experimentation, benefits are hard, if not impossible, to achieve without facing any challenges. All of the case companies have experienced some difficulties during the process.

> *"If no one takes ownership, even good things stay undone.”*
>
> – Digi team member at Company 2

Especially preparing for and allocating resources to the following pilot projects was considered challenging (the quote above is referring to this). The findings are divided into five categories: sufficient preparations, staff involvement, limited internal resources, external team quality and other challenges.

Sufficient preparations

Preparations for the co-development and the on-site event were considered as essential and also as something that requires work. Company 1 thinks these preparations were quite heavy, especially as they had set a high ambition level. Company 8 says their people were “pretty stretched” before the hackathon. However, they see that all the preparatory work is essential in aim to succeed in the collaboration. Moreover, this work takes things forward in the big picture, thus, it is “definitely not a wasted effort”.

Company 8 also underlines the importance of the beginning of the process: in addition to sufficient preparations, it's important to make sure that the focus of doing is clear and the innovation challenge descriptions presented to external teams are well thought out.

Company 6 thinks the data provided had a strong impact on the outcomes of the experimentation. In this case, it didn't enable that much. If there had been more, different and more specific data, the solutions could have become quite different. They also think first-timer host companies will need guidance on formulating the innovation challenge question better, to adjust it to the time, data and mentoring available.

"A huge risk level" was Company 7's take on the operational tasks. As this is an open initiative and the on-site event is public in e.g. social media, they think "it will be on everyone's lips if something goes wrong". Communications need to be well thought out, as the host companies often are publicly listed. "We need to be brave" says Company 7.

In addition to the work required before the on-site event, another challenge is related to the preparation for future development, i.e. the pilot projects.

"How to prepare for unknown?"

– VP, Digitalisation at Company 7

Company 1 finds it hard to prepare for future development of the concepts if they are solutions to a rather open problem. This would be easier if the problem was more precisely defined and focused. An assumption that the host company would organise itself around a new idea is considered challenging. Moreover, a company can't really act as an angel investor – the estimated ROI has to be aligned with the company's business objectives.

Company 2 thinks the ownership of the POCs and their future development is crucial. The innovation challenge cannot stop when the hackathon is over and concept demos presented. "It's extremely essential to get these cases going forward." The innovation challenge project manager from Company 2's side was in a key role in taking ownership of the concept demos. The case, which eventually became a new product in their portfolio, went forward because of him. Company 7 is very much in line with Company 2's thinking. Company 7 underlines that the follow-up pilot projects need to

be well planned beforehand, based on predicting what kind of demos will be created and who will be driving the POCs forward. This is however very challenging, as the results are unknown at the time of planning. "Who is reserving the money and for what?" This should be prepared accordingly, as it takes 6 months to get a project in the budget. The challenge essentially rises from the fact that the new concept development is agile and dynamic, whereas the funding is locked into fixed budget cycles. Preparation is key – otherwise momentum will be lost.

Company 5 echoes both Company 2 and Company 7 and points out that the sparring of host company in the follow-up activities is important. It's not just about getting ready for an event but reserving "operating money", which will enable moving forward immediately with the selected teams. "The bigger the company organising, the longer the budgeting and money granting takes. If this is not thought out, there will be idling and lose of momentum." Company 5 reflects on the preparations as follows: "While planning the hackathon, more focus was put on the event, although in the end, the event is only the starting point." They were hoping that more of the teams would have wanted to further productise the concepts themselves – now many of them wanted to sell Company 5 a project afterwards.

Company 4 would have wanted Industryhack to help more with "after action review", i.e. with the next steps after the on-site event. They consider doing a concept with an actual industrial product as very hard and would have appreciated Industryhack taking more role in making use of the learnings afterwards.

Sufficient preparations, especially related to the follow-up activities, are essential. Company 7, along these lines, emphasises that the hackathon cannot be the climax – instead, a longer story must be built around the experimentation. "There needs to be a clear purpose for this in the company's strategy. There has to be both the need and the understanding within the organisation." They see that this cannot be an individual's or a unit's whim, but the company's top management has to support the initiative and also be engaged.

Staff involvement

Getting the host company employees involved and enthusiastic about the experimentation is both essential and challenging. As Company 1 puts it, it's not a one team show – the challenge is to get the whole company aboard, as "in the best case

scenario it's very rewarding from both organisation and culture development perspectives". The people who were not involved with the POC development created "moment of inertia" within the company, according to Company 1: "The further concept development together with startups got stuck in slow decision making." Slight 'not invented here' syndrome was also present, as some of the reluctancy to proceed originated from the "we could do it ourselves" attitude.

Company 4 struggled to get people enthusiastic internally, as they were more focused on shipping products. It was also hard for them to get employees present during the on-site event weekend. When the project coordinator showcased photos of the hackathon within the company, the general response was "that's nice", but no action was taken. Company 5 also faced challenges in resourcing and getting the right internal people aboard. On the other hand, that's business as usual for them, and as the innovation challenge was their first one, they took the experimenting and learning attitude from the beginning.

The same theme is brought up by Company 7 who thinks the organisation's commitment is crucial, as a lot of effort is put on the project and nobody has much buffer for additional work. Each of these innovation challenges and related hackathon events have their own characteristics, and Company 7 doesn't have much ready yet what comes to this kind of experimentation and the resources it requires.

Limited internal resources

Even though a company would prepare thoroughly and get their staff very well involved in the collaboration, the 'everyday business' and other activities might still be prioritised over the innovation challenge and its results.

Company 1 had to freeze all new development projects in early 2016, which caused challenges for potential follow-up pilot projects. Company 2 had a better timing as their 'digi team' was fairly new and didn't have that much projects ongoing at that moment. Otherwise, the similar challenges could have had occurred. Company 4 has no "future lab" or similar, and the money used in the experimentation was taken from the project coordinator's personal budget. In this specific case this was doable, but the conclusion afterwards was that the business impact should be better defined next time.

Company 6 and Company 7 experienced similar challenges related to prioritisation as Company 1. For Company 6 their project office is currently the biggest bottleneck, as they've recently acquired three companies and their hands are full in the integration activities. New concepts are put aside and gone through every quarter. For Company 7 the challenge is their currently hard market situation. They've had to have a critical eye on all new projects, thus, no follow-up pilots have started yet.

> *"When proceeding with the concepts and taking the lead on pilot projects – this is where our product development team starts to reach its limits."*
> – CEO at Company 8

Company 8 also has challenges in having enough resources to take the promising POCs forward. Employees' time is a scarce resource, and prioritisation causes challenges for the piloting of the new concepts. E.g. one of the pilot proposals was too large in terms of budget and required people. "It's boring that the normal doing and product development creates a resource problem for these new starts." One of the challenges is scheduling the further development: "Where to put these on our roadmap?" In Company 8's case, part of the resource problem stems from their upcoming software update: the biggest package within the company's history, with hundreds of changes, is currently rolled out.

The internal resource problem is not always on the host company's side. Further collaboration needs enough resources from the external team as well, especially in cases where the host is looking for a larger collaboration. For example, if Company 3 wanted to open its e-commerce system and execute some integrations, the external team's company would need to have more size as well as references than a private entrepreneur or a small company. Otherwise, the project would simply be too wide. On the other hand, when talking about e.g. customer apps, a smaller player might work well. "However, often small players' ideas stay undone, unfortunately." Company 3 kept the scope quite wide in their innovation challenge, to be able to involve these smaller players as well.

External team quality

Selecting the teams was challenging for some of the case companies, especially when doing an innovation challenge for the first time. "How to know if they will deliver? Are they talented enough?" asked Company 1 while screening the applicants. They were

also pondering how to limit right the amount of participating teams. Further down the road, Company 1 has experienced that there are always a couple of teams who don't deliver. This is however something that they consider "being part of the process". Company 3 had a similar experience, as some of the teams didn't deliver as concrete results as expected.

Other challenges

The case companies also experienced various other, yet individual, challenges. Company 2 is "not that familiar with technology", and the data available for the teams was very limited and raw. Thus, they were "forced" to lean towards concept creation rather than trying to solve data-driven problems with the teams. Company 2 also experienced slight nervousness, as teams applied very close to the deadline.

Usually an innovation challenge lasts 2–3 months, from defining the problem(s) to be solved to the presentation of proof-of-concept demos and pilot proposals. Company 1 thinks the schedule is tight, "even very tight if the host company has no previous experience". They also considered the two-day on-site event as a short time to actually build new solutions. During Company 2's on-site event, some of the host's product and equipment demos were given too little attention by the teams due to schedule constraints.

The theme or problematic of the innovation challenge also has an impact on the obtained results. For example, hacking a concrete product is much more straightforward compared to hacking a process, according to Company 1. The more openly the given problem is framed, the more difficult it is for a team to find a relevant direction with their solution. In some cases, the constraints of environment also set much more strict requirements for the POCs, which was the case with Company 3.

Challenges may also be caused by legacy related to processes or IT. Company 2 experienced this internally, as with some of the created concepts the execution was perceived as impossible in the current situation. Similarly, Company 8 had interface related problems with two of the created concept demos, which led to postponing both of these potential pilot projects.

Some other challenges were related to an IP disagreement between two teams (Company 1), sharing business secrets (Company 3), own IT department being a bit

unorganised and not being ready to collaborate with an external community (Company 3), being very sensitive on visual material produced and published (Company 4), quick prototyping being challenging as often everything involves (heavy) hardware (Company 6) and deciding which POCs and teams actually are the best ones (Company 8).

Timing is also essential, especially when companies start to do a series of innovation challenges, according to Company 8. "Our product development has to have had the time to respond to the previous [POCs], which should have been taken a lot further already – otherwise the resource problem [in product development] only cumulates." Company 8 wants to go forward when organising the next innovation challenge, not to use time in solving the same problems.

5.4.1. Future challenges

Five of the case companies also mentioned challenges they found relevant considering the future of this kind of experimentation and collaboration.

Company 1 and Company 8 underline the importance that Industryhack keeps on evolving and staying fresh, not just for its customers but also for the participating community, that is, the external teams and companies. Another key topic raised was the concrete results via follow-up pilot projects. Company 1 still needs a better plan and Company 5 better resource allocation and alignment with their company roadmap for going forward with the teams. Company 2 emphasises the importance of concrete results and actively communicating about them.

Some other future challenges were also identified, such as keeping teams who have participated, but not selected to a pilot, interested (Company 1); having clear rules for the collaboration to avoid IPR related disputes (Company 6); and not suffocating the product development, but keeping the timing of the innovation challenges right (Company 8).

5.5. Summary of the findings

The empirical findings – motivation for collaboration, background in open innovation activities and benefits from / challenges in experimentation – are summarised in the two tables below.

Motivation for collaboration	Background in open innovation activities
‣ Testing different new concepts and experimenting ‣ Getting feedback from the data and APIs provided ‣ Building an ecosystem of startups and more mature companies ‣ Getting to know talent and their ways of working ‣ Understanding the opportunities of digitalisation	‣ Open idea platforms and competitions (internal and external) ‣ Intrapreneurship activities ‣ Startup collaboration ‣ Culture built to support trying of new things ‣ Organisational changes, such as an autonomous “digi team" ‣ Agile methods used in software development ‣ A separate “innovation fund” not tied to budget cycles ‣ Using consultants and co-operating with students ‣ Creating open (non-proprietary) platforms

Table 8: The case companies’ motivation for collaboration and background in open innovation activities summarised

Benefits from experimentation	Challenges in experimentation
Talent network ‣ Talent and potential partners at the company's reach ‣ Participating teams are professional ‣ Seeing skills, offerings and different point of views in practice —> understanding the opportunities of new technologies ‣ Innovation challenge as a tool for ecosystem building **Ideas & POCs** ‣ New ideas and concrete proof-of-concepts ‣ Many ideas tested in a short time frame **Business discussions** ‣ 7 out of 8 case companies proceeded to discussions, on average with 5 teams **Pilot projects & new products** ‣ 2 pre-pilots, 7 pilots, 2 new products ‣ These are described more in detail in the following subchapter *5.5.1. Concrete results* **Culture development & speed** ‣ Mindset shift of employees: seeing what is possible, witnessing new ways of working and understanding that tangible results can be achieved fast – even a culture shock for some ‣ Improved internal collaboration between departments, enhancing the sense of togetherness **Marketing & PR** ‣ Content for marketing and PR purposes, media visibility **Other benefits** ‣ Feedback from participants (related to data and APIs) ‣ Business environment development: impact on the general discussion in Finland around innovation challenges ‣ Industryhack provides a neutral environment for the developers to come in (vs. an individual company inviting) ‣ Gently "forces" host companies to accomplish things (such as building APIs) **Future benefits** ‣ Continuous experimentation, a continuum of innovation challenges, keeping on testing and learning ‣ The ecosystem model is considered essential ‣ The ideas and teams represent future opportunities: "It's good to know these people", the community could become a "future innovation team" ‣ Exploring the opportunities of opening more than data to externals, e.g. the company's business model ‣ Adapting the agile working model to the whole organisation ‣ "The eye-opening aspect will be strong also in the future" ‣ Using the model with more focus on hardware ‣ A tool to work towards the company vision but also developing the vision forward	**Sufficient preparations** ‣ Finding clear focus for the innovation challenge description (not too wide but not too narrow either) ‣ Preparing for followup pilot projects, that is, preparing for unknown (both money and ownership wise) ‣ The on-site event (hackathon) is essential to consider as the starting point, not the end goal ‣ Communications activities need to be prepared properly **Staff involvement** ‣ Getting people internally interested and involved (commitment from the organisation), otherwise "moment of inertia" or "not invented here" attitude might occur afterwards **Limited internal resources** ‣ Limited product development people / capacity —> prioritising needs to be done ‣ Current big priorities (e.g. recent acquisitions, hard market situation or big software update) ‣ The resource problem may also occur from the external team's side: some projects may require e.g. large scale integration **External team quality** ‣ How to know, when selecting the teams, that they will deliver? ‣ Often there are a couple of teams who don't produce that good proof-of-concepts – this is however seen as part of the process **Other challenges** ‣ Host might not be that tech-savvy and provides very raw data ‣ Two days is a short time to hack and 2–3 months a short time frame for the whole innovation challenge process ‣ The innovation challenge theme has a strong impact on the results (e.g. hacking an actual product vs. a process) ‣ Legacy IT and / or processes may prevent some pilots from proceeding ‣ Timing is essential: the purpose is not to suffocate companies' product development with the follow-up pilot projects **Future challenges** ‣ Industryhack needs to evolve and stay fresh, both towards its community and customers ‣ Concrete results via follow-up pilot projects need to be obtained and companies also need help with that (planning, resource allocation and putting the projects on their roadmap)

Table 9: The benefits from and challenges in experimentation summarised based on the case companies' experiences

5.5.1. Concrete results

Concrete results refer to the tangible outcomes the case companies have obtained from organising an innovation challenge together with Industryhack. Six out of eight case companies continued to the piloting phase with external teams. The results are described in the table below.

	Concrete results
Company 1	‣ 1 pilot (1. innovation challenge) ‣ 1 new product (2. innovation challenge, productised by the external team)
Company 2	‣ 1 new product
Company 3	‣ 1 pilot
Company 4	‣ No follow-up pilots
Company 5	‣ 1 pre-pilot ‣ 1 pilot
Company 6	‣ 1 pilot (put on hold due to unexpected market situation)
Company 7	‣ No follow-up pilots
Company 8	‣ 1 pre-pilot (1. innovation challenge) ‣ 2 pilots (1. innovation challenge) ‣ 1 pilot (2. innovation challenge)

Table 10: Concrete results from experimentation

The concrete results from experimentation for the case companies (in February 2017) are **2 pre-pilot projects**, **7 pilot projects** and **2 new products**.

5.6. Limitations of the study

At the time of the first interviews, Industryhack had operated for 1,5 years, thus, only initial results from the model are obtained in this study. Also, the point of view of external participating teams is not discussed, although their motivation is critical for the model to work. Wallin and Von Krogh (2010) state that literature often highlights the benefits of open innovation, but the rewards for outsiders or their incentives remain ambiguous. More research around that topic would be needed.

6. Discussion and conclusion

This chapter discusses the findings presented in the previous chapter and connects them with the literature and the theoretical frameworks described earlier, to form a synthesis based on existing theory and empirical research.

First, the Industryhack's collaborative experimentation model is discussed in the context of open innovation accelerators, hackathons and the coupled model of open innovation. Then, the benefits and challenges experienced by the case companies are discussed together with the findings from the open innovation and open data literature. The research question is answered and the generated hypothesis evaluated during the discussion. Next, implications on both theory and practice are provided and finally, the validity of the thesis is discussed.

This study aims to reveal the underlying reasons for a company to participate in the collaborative experimentation provided by Industryhack, the actual outcomes of such activity, as well as the experienced challenges during the process, by seeking answers to the research question: *What are the motivations, benefits, challenges and concrete results of the Industryhack co-development process from the host company perspective?*

6.1. Industryhack model

Although the structure and specific contents of the Industryhack co-development model are not in the focus of this study, it's still essential to understand, on a general level, the setup which led to the obtained results.

As Chesbrough (2007) stated, benefits of open innovation are best realised via experimenting with business model, but many companies lack the process for experimentation. Industryhack could be seen as a format provider for such experimentation. The process of the Industryhack model was presented in the introduction (Chapter 1) and consists of phases 'define innovation challenges', 'find and select teams', 'co-develop ideas into prototypes' and 'execute: develop products'. The theoretical framework selected (Piller and West, 2014) divides the process stages of the coupled open innovation model as 'defining', 'finding participants',

‘collaborating’ and ‘leveraging’. The phases of the framework, as well as the key activities of each phase, match very well with the steps of the Industryhack model. The findings of this thesis can be interpreted as results from a practical implementation of the coupled open innovation process in 8 large companies, with the help of an open innovation accelerator.

Industryhack is indeed an open innovation accelerator. As discussed by Diener and Piller (2013), OIAs provide proprietary methods and tools to an existing community of problem solvers, as well as process consulting and education. Industryhack touches all of these areas and represents the group of OIAs who help their customers to build open innovation capabilities to engage directly in co-operation with external parties. Industryhack also provides all of the three functions from Lopez-Vega’s categorisation of intermediaries: facilitating collaboration, connecting and providing service. Indeed, the ‘connector’ of the typology proposed by Colombo et al. (2015) describes best what Industryhack does: “connectors access their network of solvers and ask to propose themselves as a potential partner to collaboration with the clients”.

Industryhack could be seen as a way for those possessing relevant knowledge to reveal themselves to a company not knowing where to start looking for that knowledge. That is usually a difficult situation for management (Felin and Zenger, 2014). Hackathon is a tool used in the Industryhack model for intensive co-creation, and finding the balance in revealing enough but not too much (discussed by Piller and West (2014) in Chapter 3) to the participants is tried to be tackled by terms of participation including an NDA. As discussed in the literature, host companies’ absorptive capacity also plays a critical role in getting concrete outcomes from the model. Intermediaries can be considered as a complement for internal knowledge management activities, but they can simultaneously help in building the absorptive capacity within their customer companies (Spithoven et al., 2011), which seems something Industryhack is after as well.

6.2. Experienced benefits and challenges

The study found several benefits as well as challenges for companies engaged in the experimentation model provided by Industryhack. Similar results were also found from the literature.

Benefits

The themes rising from the academic literature regarding the benefits of open innovation were spreading risks and lowering cost related to R&D, accessing to larger knowledge pool of external expertise, finding essentially new solutions, and accelerating time to market for new products. Accenture's (2015) survey follows the literature as the top 5 experienced benefits are accessing specific skills and talent, entering new markets, improving return on in-house R&D investments, accelerating disruptive innovation in the company, and designing new products and services. Other benefits in the Accenture's list are enhancing the company's brand / image and enhancing the entrepreneurial culture of the company.

The findings from open data in private sector (Herala et al., 2016) provide similar benefits. Although this thesis is not about companies opening their data publicly, but rather selectively, the comparison is still relevant. These benefits are increasing collaborative actions and competitiveness, addition to ecosystem-wide engagement and communications, enhanced innovation and development, internal change within company processes and methods, and positive public image.

The empirical findings support the aforementioned findings from previous research. The main benefits from Industryhack experimentation model, for a host company, are access to talent network and ecosystem building, getting ideas and proof-of-concepts tested, business discussions with potential partners, pilot projects and new products, company culture development towards more open and supportive for agility, and marketing / PR activities. Also, the neutrality stemming from Industryhack's position of an independent intermediary was considered beneficial. The benefits found from open innovation, open data and empirical research are compared in the Table 11.

Concrete results are in the core of the experienced benefits. Although these 2 pre-pilots, 7 pilots and 2 new products show that majority of the created concepts don't get co-developed further after the innovation challenge, these numbers justify there is a lot of potential for this kind of experimentation model to create even better results. According to Piller and West (2014), companies working with intermediaries would actively be engaged in recruiting the participants. This research argues against the statement, as only one participant form one innovation challenge was hired afterwards.

Benefit	Open innovation research	Open data literature	Empirical findings
Accelerating time to market for new products / enhanced innovation and development	X	X	X
Positive brand / public image	X	X	X
Access to external knowledge	X	X	X
Increasing collaborative actions and competitiveness	X	X	X
Designing new products and services	X		X
Enhancing entrepreneurial culture in the company	X		X
Finding and testing new solutions	X		X
Ecosystem building		X	X
Internal change within company processes and methods		X	X
Lower cost / better return of R&D, spreading risks	X		
Entering new markets	X		

Table 11: Benefits of openness found from literature and empirical research

Challenges

The challenges regarding open innovation were summarised in the literature as follows: stretching traditional management thinking (open mindset needed), maintaining large number of connections with multiple partners, selecting from many alternatives, external ideas being hard to evaluate (and often both internal and external ideas need to be recombined), and cultural aspects, such as employees' mindset (e.g. the 'not-invented-here' syndrome). The challenges found from open data literature were decrease in efficiency, increasing costs, problems caused by public access to data (not applicable in the context of this study), and changes required from the company. The challenges from empirical findings consist of sufficient preparations (also for followups, not just for the on-site event), staff involvement (getting people internally committed), limited internal resources, and external team quality (in terms of delivering results). Also, legacy IT infrastructure or processes might affect the collaboration outcomes negatively.

Challenge	Open innovation research	Open data literature	Empirical findings
Stretching traditional management thinking	X	X	X
Changes required from the company	X	X	X
Selecting from many alternatives	X		X
Cultural aspects, e.g. employees' mindset	X		X
External ideas being hard to evaluate	X		X
Increasing costs		X	X
Sufficient preparations			X
Staff involvement			X
Limited internal resources			X
External team quality			X
Maintaining large number of connections	X		
Decrease in efficiency		X	

Table 12: Challenges of openness found from literature and empirical research

Frey and Luks' (2016) remarks about hackathons fit well the previously described challenges: good preparations (also for followup activities), management support, and dedicated people as resources are essential for success. Piller and West (2014) point out similar issues, although in the context of sustained process of collaborative innovation: organisation commitment and dedicated resources are crucial, especially for ongoing interactions with external contributors. Moreover, they underline the importance of the initial scope at the start of the collaboration process, to avoid 'garbage in, garbage out' situation.

Henkel et al. (2014) suggest that installing a separate organisational unit might be a right way to tackle challenges related to innovation. This view is supported by the findings from Company 2: the collaboration resulted in an actual product, and the company was the only one from the sample who had a separate team dedicated to exploring the opportunities of digitalisation. In turn, West and Gallagher (2006) state that one of the challenges related to collaboration is to incorporate external innovation into internal development. This was the case with Company 8, who explicitly stated the challenge related to getting projects forward internally. However, they also have the most concrete results out of the case companies, which indicates that others had similar problems regarding follow-up initiatives.

Hypothesis evaluation

The hypothesis defined in the beginning of this study turned out quite valid. The obtained concrete results (i.e. pilots and new products) benefit the case companies the most. In addition, POCs, company culture development and positive marketing / PR are considered as benefits by the case companies. Other essential benefits, that were not included in the hypothesis, are access to external knowledge and ecosystem building. These lastly mentioned benefits are also the case companies' key motivations, among the opportunity to test different new concepts.

Challenges, both mentioned in the hypothesis and being part of the findings, are allocated resources (sufficient preparations, staff involvement and limited internal resources) and quality of the teams (and their POCs). Also the 'adapting to the more agile way of product development' included in the hypothesis seems to be accurate, as not that many pilots have started in the case companies, compared to the amount of POCs (with potential) developed. This is naturally also tied to the resource challenge mentioned earlier. What was part of the hypothesis, but not part of the findings, was the challenge related to opening business sensitive data to externals. This wasn't an issue for the case companies, most likely due to the terms of participation (including an NDA) accepted by all of the external participants.

6.3. Implications to theory and practice

As the end result, this study has shown an example of what kind of motivations, benefits, challenges and concrete results are inherent in the collaborative experimentation model provided by Industryhack.

From theoretical perspective, this research contributes to the coupled open innovation model (Piller and West, 2014) by showing the results of using such model in practice. This thesis also contributes to the open data research. Although none of the case companies fully opened their data to public (instead, they selectively revealed some of their data to participants under an NDA), many similarities were found when looking at the benefits and challenges of opening data described in literature (Herala et al., 2016) and the empirical findings of this study. In addition, the author of this thesis has also contributed to a research paper called "Strategy for Data: Open It or Hack It?" by Herala et al. (forthcoming). The paper uses the findings of this thesis (among other

data) and its results indicate that “hackathons offer more practical solutions and control over the fundamental open data approach, which provides better inroads for companies to monetize their datasets and information assets”.

From practical perspective, this study reveals a lot of relevant information for a company evaluating the opportunities to engage in collaborative activities with external innovators. Not only the benefits and challenges related to working with one specific open innovation accelerator are highlighted, but also the case companies’ motivation to collaborate, the concrete outcomes of such collaboration, their current background in open innovation activities, as well as the future benefits and challenges perceived by these companies are presented. The findings suggest that large companies should lower the barrier to engage in different co-operation opportunities within their external network.

This thesis also aims to do its part in responding to Tucci’s et al. (2016) call for building more understanding around what motivates or discourages companies to engage in open innovation activities, and what factors affect the outcomes of these activities.

6.4. Validity of the thesis

To evaluate the validity of this thesis, the criteria developed by Whittemore et al. (2001) is used. Their criteria of validity is divided into two parts: primary and secondary. The primary criteria consists of credibility, authenticity, criticality and integrity, and the secondary criteria of explicitness, vividness, creativity, thoroughness, congruence and sensitivity. All the following descriptions related to the criteria are based on the work of Whittemore et al. (2001).

From the primary criteria, ‘credibility’ assesses whether the obtained results describe the interviewees’ opinions in a true manner. In the study, the results are presented as general statements derived from the specific experiences described by the interviewees. These statements are supported by direct quotes from the interviewees (anonymised) related to a specific topic. ‘Authenticity’ questions the way the interviewees’ perspective is present in the results. Only explicitly mentioned opinions were included in the results, although some of the empirical findings could have been applied to several of the case companies. The interviewees were allowed to speak

about what they felt the most relevant, that is, they were not guided by e.g. questions derived from other interviews. 'Criticality' evaluates the amount of criticism towards the obtained results and related theory. In this study, the results were first presented objectively and later on discussed in the context of selected theory. The theoretical framework wasn't taken for granted either as it was formed from two separate models: one related to the Industryhack format and the other to the benefits and challenges in opening data to externals. Moreover, the findings of this study were used to publish a new academic paper. The final primary criteria, 'integrity', assesses the checking of validity throughout the study as well as the humbleness in presenting the results. The results were described in a humble manner and all the claims were backed with empirical findings or theory. The validity of the interviews was evaluated in the methodology (Chapter 4).

From the secondary criteria, 'explicitness' is related to the methodological choices and researcher biases. Qualitative approach was used because the context of the study is contemporary and the theoretical framework only emerging. Several biases might have affected the validity of the results. Firstly, two of the interviewees were acquaintances to the researcher which may have led to revealing more information compared to the other interviews. The researcher is also employed by Industryhack, which both gives already established connections to the interviewees and background knowledge about the Industryhack model to the researcher. This might have also affected the openness and truthfulness of the interviewees, especially related to honest feedback about the collaboration. 'Vividness' relates to the depth of presenting the results and their narratives. In this thesis, the results are presented with descriptive examples and direct quotes. 'Creativity' assesses the visualisation and analysis of data. In addition to verbal content, the study uses tables and figures to present the used theory, empirical findings and results.

'Thoroughness' evaluates how the research question is answered by the findings and discussion. This research first presents the results as thoroughly as possible, then applies the theoretical framework to the results and finally discusses the findings. The harmony of the research process and results is considered by 'Congruence'. This study started by gaining insights from past research and understanding better the Industryhack model. The selection of theoretical framework, as well as writing the literature review, happened in parallel with the interviews. Usually, both the literature review and theoretical framework are ready before starting the interviews. Thus, the order of research of this study might have negatively affected the results, as not all

knowledge from theory was taken into account during the interviewing process. The final secondary criteria, 'sensitivity', assesses the nature of the research process and findings in respect to the interviewees, industry and social community. The topic of the thesis was formulated by the researcher based on personal interests as well as discussions with Industryhack founders and the thesis advisor. The research topic was considered interesting as the phenomenon is fairly new and not much had been written about it yet. Moreover, the concrete results were of much interest both for the Industryhack team as well as the case companies and further on for the whole industry of open innovation that is looking for better models of mutually beneficial collaboration between organisations. The empirical data was enriched by asking an e-mail update from each of the interviewees about the concrete results, to get the most recent data for further analysis. The anonymity of the case companies and interviewees was kept throughout the study.

6.5. Conclusion

This thesis is one of the first reviews on the concrete results, benefits, challenges as well as motivations related to large companies using the coupled innovation model in practice, with the help of an open innovation accelerator. The found benefits and challenges reflect the ones mentioned in previous open innovation and open data literature, but they also bring new angles to the mix, as both the challenge-driven innovation process and hackathons are fairly new phenomena. The concrete results (i.e. what goes beyond ideas, concepts and discussions) for companies using the collaborative experimentation model provided by Industryhack, were pilot projects as well as actual new products.

This thesis contributes to the theory by providing insights of a practical implementation of the coupled open innovation model as well as by building connections to open innovation and open data research. Moreover, the findings of this study are also used in a to-be-published article "Strategy for Data: Open It or Hack It?" by Herala et al. From practical point of view, the findings support decisions makers in large companies to understand the beneficial factors, as well as the underlying challenges, in experimental collaboration with externals. The research methodology used is qualitative and the results were obtained by selecting eight case companies and doing nine theme interviews.

6.5.1. Future research

This study only brings one glimpse on the field of inter-organisational experimenting. More research is definitely needed on other companies taking part in open innovation activities as well as on other open innovation intermediaries and accelerators. Also, for building a sustainable foundation for collaborative activities, the incentives of external teams and companies participating in coupled open innovation processes are essential to understand better. Moreover, the rules of collaboration, especially related to intellectual property, need more focus in future research in all of the phases of the collaboration. An interesting theme rising from the literature, requiring more research, is the network form of open innovation collaboration (communities, ecosystems and platforms) and how to design, organise, motivate and harness such collaboration (Vanhaverbeke et al., 2014; West and Sims, 2016).

Piller and West (2014) state that each stage of the coupled open innovation process model also requires further research. Moreover, they conclude: "Open innovation provides rich possibilities for new, fundamental discoveries, including empirical and theoretical developments and corporate experiments in openness. If the first ten years of intellectual progress is a testimony to the future, it is possible to be fairly optimistic for a greater appreciation of the rich, diverse and even unexpected ways that the lens of open innovation can bring to understanding the innovation process in the next decade."

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Appendices

Appendix 1: Interview questions

1. BACKGROUND & PREPARATIONS

- What is your background and role at the company (shortly)?
- How did it all start? Why did you choose to co-operate with Industryhack? Did you think of other partners?
- How was the decision to organise an Industryhack innovation challenge perceived in your organisation? What kind of team was in charge of the project internally?
- How did you define the project objectives? What were they?
- Do you have any comments on the process with Industryhack prior to the hackathon event?

2. ON-SITE EVENT / HACKATHON

- What kind of feedback would you give about the Industryhack hackathon event?
- *Discussing through the most promising teams and their proof-of-concepts*

3. FOLLOWUP ACTIVITIES

- How many teams sent you a co-operation offer?
- Which teams did you select to cooperate with? Why these?
- What concretely happened afterwards? What was the model of co-operation?
- If we look at these starts now, where are they? What's your role in each of them?

4. THE WHOLE INNOVATION CHALLENGE

- What have been the benefits of this kind of approach?
- What would you consider as the future benefits?
- What kind of challenges have you faced with this approach?
- What kind of challenges could emerge in the future?
- *If collaborated with Industryhack previously:* How would you compare the experiences and results?

5. ABOUT OPEN INNOVATION

- What is your company's relationship with open innovation in general?
- Are you engaged in activities such as internal acceleration of ideas and teams? Do you use external help such as consultation?
- Is open innovation in your strategy? Have you defined clear targets for it?
- Do you have a need for an open innovation community?

Appendix 2: Findings (anonymised)

Experiences of open innovation acceleration – motivations, benefits, challenges and actual results for industrial companies II Empirical findings (anonymised) II Juho Kokkola

	Motivation for collaboration	Background in open innovation	Benefits from experimentation	Future benefits	Challenges in experimentation	Future challenges	Other findings
Company 1	▸ **What could be put together in 48 hours?** ▸ **What could be done with the APIs?** • Testing rapid prototyping philosophy in real life situation • Development angle first (before business incentives) • Wanted externals to be able to wrap their minds around the challenge without deep business understanding ▸ **Considers important to have this kind of community to develop different ideas and concepts with** ▸ **Need to partner with smaller companies and startups to get them interested in the industrial internet —> develop the ecosystem and grow the industry as a whole** • Build a network in Finland for industrial companies **to understand better together the industrial internet concept and its opportunities and challenges** • "The event is also a great way to network and support startups and small enterprises" • "There's a lot of mechanics, electricity, and automation involved with our machinery, **but when it comes to coming up with new ways to measure or analyse data and bring it to our users on mobile applications, we're not necessarily the most agile innovator**" • **"We cannot have our own resources in all areas of the industrial internet, instead we need to use our networks to develop them. [Industryhack] gave us a chance to find fresh angles from people outside of our industry."**	• Student collaboration • E-mail address: open forum for employees, internal web page live feed • innovation contests every year with prizes, also the person moving it forward will get a prize ▸ **Building open APIs and general platforms to enhance collaboration, no proprietary platforms or closed environments** ▸ **Industrial internet as a strategic initiative, not just new technology but also experimenting new ways of working**	• "Good experience" & "Results surprised positively" • **Three teams combined (concept + embedded software + app development = working prototype)** —> presented in internal conference for management. **Happened as a research project, two external teams (companies) invoiced. Very fast execution, 3–4-week project** including contract negotiations ▸ **Thoughts and concepts used in product development** • Testing with users, user experience is the key in whether switching to something new or sticking with the old • Discussions taken forward with one other team as well • Key learning: **"What had been thought of for 3 years and developed for ½ a year was now done in two days by outsiders" —> clock speed can be raised significantly** • Longer term impact: **the first hacks had a big impact on the general discussion in Finland: showing example by doing (this can be done and companies can benefit from it)** —> impact on the existence of these kind of activities —> has now become a modus operandi —> **now we talk about ecosystem model of operating = concept building & experimenting**, connected people and companies, participants benefitting, 3rd parties (e.g. technology partners) benefitting (2nd hack) • "Industryhack's method is a good foundation for developing this ecosystem" ▸ **Accelerates innovation process as a whole —> big impact on renewing the company. Now they know a lot of companies & talent (and what they can do) from relevant fields** • Many POCs weren't ready to launch / apply in an industrial context, but **"several of them could be developed into full-blown products with a bit of fine tuning and additional integration."** ▸ **"Industryhack provides a neutral environment for the developers to come in"** —> better than individual companies inviting developers in ▸ **Helped us to develop our API** ▸ **Helped us to develop our ability to work with external developers** ▸ Recruiting and **finding talent** • One participant hired afterwards (UI development) ▸ **"Our ability to reach the right people is not very good compared to Industryhack** – you've better links which is valuable for us." • Discussion about the business and industry, relevant feedback and questions • Eye-opening: witnessing the ways of the outsiders working (together with the staff), **new perspectives, things can be done fast & effectively, culture shock for many** ▸ **Followup projects within voice recognition, this feature tested in a new product introduced in summer 2016** ▸ **One team (company) developed a solution internally, now sells it to the industry, in discussions with the host (good fit) —> "Could well be an additional solution for us to sell with our products and services"** • Many partners, a lot of people —> "carnival spirit" ▸ **One "pilot" happened afterwards in the factory, which was related to something what had been prepared for the hack** —> served as basis for followup projects ▸ **Activates different parts of the organisation** • Touched many parts of the company (research, product development, maintenance business, service business, IT and factory) —> **strengthened a lot the information flow and collaboration & raised the atmosphere / togetherness significantly & not just for the outside but making use in the internal culture change, "sucking the agile development mindset in the house"** ▸ **Raising the openness of product development "has been a right thing" that has sticked to the company culture**	▸ **IT is the biggest growing part of the business** ▸ **The more new improving ideas, the more the company moves forward** ▸ **What could be achieved during a longer period of cooperation? —> opening up the company's business model and letting people play with it** ▸ **Adopting the working model to the whole organisation** (short projects with DLs, moving forward at a fast pace) ▸ **Finding help and new angles to their platform and API development**	• Two teams (companies) didn't find an agreement on who owns the IP of the created software ▸ **Schedule is tight, even very tight if no previous experience** ▸ **Many things unknown as doing this for the first time: Applications and team selections – How to know they'll deliver? Are they talented / capable enough? How to limit right the amount of participants?** • **Always a couple of teams who don't deliver – this is however part of the process** ▸ **Two days is a short time to hack** • Intangible theme vs. a concrete product —> not so straightforward to "hack it" if intangible • No followup co-development projects (for now), **teams were not ready for proper (committed) collaboration** (2nd hack) • All new development projects were frozen in early 2016 (a challenge for potential followups) • More partners involved brought also more work • **Quite heavy preparations** (due to high ambition level) • **Not a one team's show (in a large organisation) – the challenge is how to get the whole "gang" aboard** —> in the best case it's very rewarding from both organisation development and culture development perspectives • Big bets, big risks and big wins —> risks are however manageable • **The parties (people) who were not involved with the POC created "moment of inertia" within the company** – further idea development together with startups got stuck in slow decision making, "don't want to start doing because we could do it ourselves" • The "Open Challenge" is often a bit difficult • **Open challenge: hard to prepare for future development of the concepts** —> if the problem & challenge would be more focused / limited, this would be easier —> Now the assumption is that the company organises itself around the new idea (which is challenging) • The role of an angel investor (funder) is challenging	▸ **Industryhack has to evolve to stay fresh – keeping hackers interested, not just companies** ▸ **What keeps the teams coming who have participated a couple of times but with no concrete outcomes (prizes or pilots)?** ▸ **Better plan needed for the teams to go forward** • Even though this is fun it's still serious business	• Done two hacks • Product development, marketing, communications and R&D involved • Themes: Safety and productivity & Wow-impact for the customer touchpoint • "I wouldn't only recommend but seriously encourage any company to do an Industryhack." • High level of interaction between host's employees and hackers ▸ **Although a competition, people were collaborating and having fun** • Happy coincidences occur when not trying to limit too much (e.g. the participating teams) • Good commitment from company side in the collaboration • Followups: some sent immediately an offer, some approached with the aim to continue discussion, some the company contacted themselves, some did not react (~50% of the teams) • **High ambition level: own facilities and the employees full-on involved** (2nd hack) – also: interfaces, data, history data and other necessary systems ready ▸ **Right mindset: business people involved early on (2nd hack) & more focus, challenge more specified & preparing for follow-up work, people named to receive and move the results forward** • Industryhack: "making people meet" – *toimijoiden kohtauttaja* ▸ **"Hackathon competitions give organising companies and IT suppliers a good opportunity to vision the future of IoT"**
Company 2	▸ **Digitalisation taken into strategy in 2014** • **"Digi team" formed in 2015**, the interviewee was recruited to that team from outside • Digitalisation is part of their services ▸ **Focus on new service development with digital angle, also responsible for digital business** —> starts to be "business" already after one year of operating ▸ **Hackathon as one of the first thoughts —> Industryhack shortlisted because "spot on"** • Wanted to put effort and execute well • The world is changing fast: **digitalisation – no industry that won't be affected by it**, "either you are aboard or out of the game"	• Digi team structure: business side + centralsed resources from IT department • Digitalised services as the starting point – **platform for experiment —> when a good concept is found (no matter where it comes from) it's important to find an owner who drives it forward —> digi team gets involved and helps the owner** in the process (lean methods) • Digi team in a way like "overtaking line" —> **no questions need to be asked (own budget to use & case presented to digi-executive group who give green or red light)** —> in a way also intrapreneurship • Cases / solutions need to have direct connection to customers ▸ **Permission to fail** – this is an experimentation team ▸ **Digi team is temporary**, it exists until 2018 when the need for it is re-evaluated (are its activities already implemented in other parts of the organsation?)	▸ **A lot of work taken away as the "recruiting" of the teams is done by Industryhack** • Business discussions with four teams and one individual ▸ **Out of these one POC was already decided to be taken forward at the hackathon** —> separate meeting with the team and the industry manager —> first light business case modelling, then building MVP —> work ordered in pieces, also other people from team's company involved ▸ **Lean culture (and exceptional digi team position) enabled the development of a completely new service. ROI already positive after ~7 months from starting the pilot.** • One of these teams had an own platform and looked for an access-to-market parter (conflicted with their ongoing pilot) • One team's service designer offered him/herself to work for them (didn't happen in the end) ▸ **In summary: "Industryhack speeded up the digitalisation of our plant"** ▸ **People who really look from outside of the industry in practice creating prototypes (ideating and demonstrating solutions)** ▸ **Testing many different concepts in a short time period** ▸ **Good feedback from own data: is it beneficial / usable? On what level is it? —> got development ideas on what it should be in the future** ▸ **Helped a lot in internal culture change, also afterwards** (25–30 own staff visited during the hackathon & bringing people in was relatively easy (even surprisingly easy)) ▸ **Marketing & PR, small resources but significant benefits**, started to show immediately —> people who came to meet afterwards —> many of them had noticed the hack —> these people said "you're the innovative company doing digital services" —> still many refer specifically to this hack ▸ **New cases, concrete products and services**, prerequisite was that (at least) one concept is found which is taken forward and made into reality —> that was achieved ▸ **The new service has proven to be a good one, generates revenue —> confirms that it actually is a good case, not just something that was done but led nowhere** —> constantly growing and has potential to become much more than what is now	• N/A	• **There was enough time as the digi team was new and not so much other things going on yet** – could've been a challenge otherwise ▸ **No real-time view on the applications (their status)** ▸ **One week before applications DL cold sweat** – only five teams had applied, however, a good amount of applications received in the end • From host side: English skills of the presenters on site were very limited • **The host is a service company – not so familiar with technology** —> very "raw" regarding the data available —> teams might have wanted more to investigate and play with • Now "had to" select concept creation hack instead of data-driven (results heavily based on data available) • Great hackathon, good demos, people thanking and clapping (also patting on the back) but **no one takes ownership** —> **can't stop there** —> extremely essential to get the cases going forward —> the interviewee had a key role that ownership was taken of the concept demos —> **the new service concept went forward because of him, "if no one takes ownership, even good things stay undone"** • **Internal challenges: process or legacy IT related** —> even if a potentially good case, the execution is experienced as impossible in the current context	• Big picture: hackathons were new and cool back in 2015 —> now they start to be mainstream and the question asked is "what has concretely come out of these hacks?" —> important to show & share the results (what has been born in these? what are the cases that have gone forward?) —> if these followup cases don't happen, but this whole thing is just a weekend-long stint, the whole phenomenon will dilute itself • The interviewee sees that Industryhack can profile itself as the one who "does the actual things" – actual business related issues (e.g. additional revenue, cost savings) —> "You are the Mercedes-Benz of hackathons" and in that role the importance of the results grows • There is a lot of "buzz" (*pöhinä*) in the hackathon space which has its own demand (light execution and investment from participants ("rough specs and buzz"))	• The interviewee prepared to sell quite a lot internally the innovation challenge but this went actually easily through – monthly digi-executive team meeting: 10-15min discussion and decision • Digi-team executed – datasets prepared by business intelligence team • The interviewee collected a lot of feedback when looking for the suitable challenges —> shortlist of people, approx 10-15 —> sessions with these people to define the challenge themes —> final specs 100% around services, specific themes got their final form during the process • Followup with all the teams —> one-hour session per team —> going through the POC —> Does the team want to continue with that or some other direction? • Four ways of measuring digi-team performance (constantly iterative process) – 1) own internal process / pipeline (ideas, concepts, pilots, ready products), 2) learning of the rest of the organisation (advancing the learning in house) —> Has the culture change advanced in the organization? How many products can be integrated as part of business? What are the products' results?, 3) customer metrics (by product & service): e.g. satisfaction, retention, 4) financial metrics: are the services generating revenue? How much (per customer)? What's the growth %?
Company 3	• The interviewee has passion for ICT, also involved in many development projects —> talked to CEO, discussed in executive group —> decided to do this ▸ **Unhappy with own concern's development / IT side, development stalls and follows old patterns** ▸ **Were in need of sparring, something that opens their own organisation's eyes** ▸ **When been in the in industry for a long time, a certain vision is established: "how things should work" —> when 50-60 pairs of eyes are thinking out of the box, there is a chance some gold nuggets get revealed** ▸ **Twofold issue: many times tried to get things forward —> "yeah, costs 500k and takes 2 years" —> the train passes by —> imprisoned by own brains, the mindset changes when doing constantly the same —> outsiders bring fresh thinking to this conservative world** ▸ **Positive response in the organisation** —> very good collaboration with the parent company • Videos worked well in demonstrating the Industryhack concept internally – people got engaged • Criteria for POCs: innovativeness + followup potential & scale	• They use consultants • Development department is internal, often the task is to take forward the current tools (mobile side, automation —> not so innovative but "basic stuff" for many, requires a lot to integrate and connect • Internal ideation system with prizes – the starting point generally is improvement and better efficiency, not so much about building something new • Many companies approach with an idea they'd like to talk about • They have a modus operandi for these approaches, a methodology defining the channels used and how they are dealt with	• Many kind of scopes, many teams went to the consumer side ▸ **Good thoughts and ideas**, selected one winner and two runner-ups ▸ **"More than half were brilliant material"** ▸ **8 offers sent —> collaboration ongoing with the winner team, piloting (partly) ongoing** • One offer was a good idea but a bit too broad and costly • Runner-ups didn't go forward but **in discussions with three other teams** ▸ **One team didn't send their sales person but four coders** who knew exactly what they're talking about (what can be done and what can't) – **honesty was appreciated** —> business side, e.g. pricing, was then a bit more difficult —> trust was established —> different team than in hackathon —> **"most likely will do business together"** • Fourth team coming to discussion ▸ **Talked with every team who sent the offer —> "we try to suck this sweet as long as possible" —> "if a team doesn't hear from us for 6 months, it doesn't mean we are not interested"** • Going through the list again in the autumn when other projects ease —> will ask specific teams if they wish to present again / the idea's current status	▸ **Opens eyes, just like did to our IT department —> a lot can be achieved in just one weekend, when there is will end energy**	▸ **Many teams looked promising but then turned out to be a slight flop** —> someone with an excel file & "i have an idea" is not worth it —> **concreteness is key**, no powerpoint presentations • Concreteness – crucial to validate the concepts (some teams didn't do this well enough) • A couple of teams didn't develop enough (or at all) during the process —> a counter example: one team (with previous collaboration with the host) built an app that looked immediately right (also brand-wise) • Important that the presenter is good in speaking (English) ▸ **In a big concern you can't engage in larger collaboration with just one / two person company – resources are not sufficient** —> we can't open our systems to a small company or private entrepreneur because it's too wide —> if there's e.g. a will to integrate, there needs to be size and references behind ▸ **On the other hand when talking about e.g. apps or games, then a smaller player might work well** —> "However, often small players' ideas stay undone, unfortunately, but that's a cold fact" • That's why the scope was wide in the innovation challenge – to be able to involve these smaller players as well ▸ **A lot of business secrets** • **Own IT side a bit "a mess" / "in the making" at the moment** —> what's development, what's support – slight contradiction —> not ready yet to collaborate with an external community, soon maybe	• N/A	• 6-person team involved internally ▸ **Finds the external developer community very interesting**, "each of these have their own foundation and structure" —> it would be nice to have a pool of developers / designers from which to pick, on the other hand it's hard to make work —> **"Teams have good talent, why not to make them employees?"** —> take into the existing big developer team • In 2–4 years could organise again —> slight excitement / nervousness in the air as things are a bit "mess" currently and not so clear status quo

	Motivation for collaboration	Background in open innovation	Benefits from experimentation	Future benefits	Challenges in experimentation	Future challenges	Other findings
Company 4	▸ **Did a hack without assumption of things going forward (followups weren't much on the agenda)** • Interviewee's boss got interested and green light was given	• Starting now, under the term "new business models" ▸ **Looking at services and portfolio development —> What's next? Health? —> get involved with this** • Uses external help, collaborates e.g. with industrial design studios • Trend forecasts	▸ **People still talk about the hack inside the company** • **Object communication as a theme will be relevant for long**, not necessarily in a hurry to do that • At Slush people gave good feedback that they did this —> **good PR** ▸ **Was very happy with the different ideas, "great stuff"** ▸ **One key stakeholder was very impressed by the speed (only three days of development for working prototype), normally takes weeks or months** • When invited to give a talk, uses the hack photos to tell what happens inside the company ▸ **Realisation that "traditional problems" are not that big anymore when you can actually stretch much more (referring to what Industryhack can offer)** ▸ **Ideas / POCs** ▸ **Empowering people who have no "innovation / strategy" in their title** —> open for anyone in the company • It's old school way to have an innovation hub, instead it's better to have more people involved —> **"strategy is for everybody"**	• Are thinking of doing a hack again, would involve web and customer scene as well —> also focus on something to get out and to get seen ▸ **Would be great to have a team that could go forward after the hack** • About open innovation communities: **"future innovation team" is hard to found internally and outsourcing that is super hard —> Industryhack could take role in that** • **"Industryhack around services"**, e.g. health & wellbeing	• **Struggled to get people enthusiastic within the company**, they were more focused on shipping products —> was also hard to get staff present during the weekend ▸ **There is no "future lab" within the company** • people were afraid what are the real costs are vs. results —> Now it was ok • **A lot of money invested to an experimental project – tough"** (when there's no clear business impact (next time this would be more focused on)) • It was hard to find the way to pay the winners (was invoiced) ▸ **Service agreement with Industryhack essential, especially after action review —> more time spent afterwards**: what happened, what was learned, could Industryhack take more role in that? • When showcasing photos within within the company, **internal teams' comments were pretty much "that's nice" but no action was taken**, "nothing happens" ▸ **Doing a concept to an actual industrial product is super hard** • Community engagement, marketing-wise, is hard to scale to income (direct sales)	• N/A	▸ **User marketing a better approach than the industrial context** • The company could possibly empower teams' crowdfunding campaigns • **Opening up a new center related to their industry —> could have an Industryhack exhibition there** – focused on storytelling
Company 5	• Heard that a peer company had done previously —> Went to talk with the responsible person from that company and got positive feedback from him ▸ **Had an API related challenge earlier that year —> this provided a concrete way to continue testing the APIs** ▸ **On the other hand: looking for collaboration with startups** • Objectives: Enhancing UX & easy tools for facility managers & improving maintenance operators ▸ **Host company provided the challenges, Industryhack gave the framework on what level these goals should be** • Mental commitment done before Slush —> Slush used in pre-marketing —> partner discussions during the fall	▸ **Their first API related challenge was launched some years earlier —> the angle was to see if the interfaces were opened, what would people develop —> got better understanding on what kind of APIs were hoped for** • Through an open call they've got approximately 10 companies in discussions (some gone forward slowly, some faster —> looking for the right collaboration model) ▸ **After these came Industryhack** ▸ **They promote startup collaboration & quite a lot startups approach themselves as well**	• Went through the POCs (which have potential to go forward and which not) ▸ **5 winner teams selected** ▸ **The event went really well** ▸ **Discussions with half of the teams** • **After hack, three top teams pitched for executive group** + one team via an open call ▸ **Offers are on the table and some are still coming** ▸ **Concrete decisions in early June —> with one team a "mental decision" exists already —> believes that a couple of teams are taken (at least a couple of steps) forward** ▸ **16.2.2017 [One of the three teams has proceeded to concrete testing on a real customer site, other two in discussions still (evaluating summer's / fall's PoC results)]** • **Small steps, in phases** (no big commitments immediately), roughly 5–50k projects • Pilots, may also include some feasibility study, depends on how ready the concept idea is • **First step could be 20–25k**, that should be enough to make something with, "time will show" the next steps' size • Started before summer, **after summer (Aug–Sep) the first steps ready —> just on time for budgeting next steps to the next year's budget** ▸ **Media visibility** ▸ **They want to work with startups – a concrete way to show what and how** • Give the participants a deeper understanding on what are the current problems and challenges ▸ **Organised an internal hack before the external one —> positive feedback from staff —> energising impact** ▸ **Meeting potential good partners** ▸ **Concrete POCs to be taken forward**	• Next step: **ecosystem model is "sold well" internally —> hack is one tool in that palette – a great tool in linking internal and external innovation**, will do again for sure – not just in Finland but other countries also in talks • Hardware is one angle they have pondered (now very software focused) as they are very much in the HW world still —> in some countries R&D is focused on HW —> a hack with HW focus?	▸ **Hoped that more teams would have wanted to further productise the concept themselves —> now many wanted to sell them a project ==> startups vs. software consultants** • While planning the hackathon, more focus was put on the event, **although in the end, the event is only the starting point** • **Sparring the host is important —> getting ready, not just for the event, but reserve (e.g. 100k) operating money, which enables moving forward immediately with the selected teams** ▸ **The bigger the company organising, the longer the budgeting and money granting takes —> if this is not thought out, there will be idling and lose of momentum** • Resourcing things to get the right people aboard (daily business on the other hand) & first time is experimenting and learning (as it should be) —> no major challenges	▸ **How to tie this clearly in the company's roadmap?** ▸ **Resource allocation and reservations for the post-hack actions (not just the event)**	• Brought quite many partners aboard • R&D "bought" the idea to organise a hack —> agreed with the head of product development that their department will cover the costs • Three-person core team (internal project manager from R&D + marketing / communications / event person) • **How to better connect to the global field / community?** How to be better visible there? —> own processes and ways of work really need to be sorted out • The interviewee's job: end-to-end process – **How does their ecosystem model work? —> Open innovation strongly in the agenda** • **They want to create a living and growing application / partner ecosystem around IoT and APIs** • Startups don't typically have customers, they have a lot globally —> could take them there + possibility to link their own solution to their (host's) products • **In the look for a holistic model** —> to support this they want to use tools: competitions, hackathons etc —> now thinking what would maintenance require • **What else could Industryhack offer than hackathon events and via what kind of international network?** —> If done in e.g. Asia, currently means finding a local partner – there are companies who do this on an international level, requires network • Talked about **the Industryhack platform: Could that be connected to Tekes in Finland? Or EU-level funding in Europe?** —> integrated grant / funding template? —> host company puts in some money and Tekes would double it? ==> accelerating ideas on multiple lanes • EIT Digital or Horizon in the above? ==> **the support / matching element would enable host companies to take more risk and go forward "with multiple horses"**
Company 6	• Discussed with IT about the data available and what could be shared —> that was used as the basis to form the given challenges • Delivery and consumption data	• **Own idea platform (passive), "from idea to business" is the theme** – phases: idea generation, idea screening, idea development —> the beginning of the funnel is fully open, anything can be proposed from wherever ▸ **Ideas are generally divided into three categories: 1) from R&D, 2) initiative box from employees, 3) strategy-driven where management asks specific questions** (in the new intra every quarter) followed by a 2-3-week discussion period • **Screening weekly**, so called "idea silo" – R&D, technology management, strategy, business and the interviewee involved ==> **50% incremental ideas —> thrown to respective business / process owners** • Feedback and/or note is given to all ideas ▸ **"Strategy rug" made when a good idea is found —> rugs are checked by executive group and project office —> if going forward —> goes to the formal process (the funnel has 2-level screening & feedback)** ▸ **No quick prototyping —> often hardware involving and heavy** • Idea card: idea summarised & who's benefitting from the idea? & what would idea execution require form the host company? & how does the idea support strategy? • Idea process works also as "parking" —> idea discussed and formulated —> if not gone forward, put in the stack (or parking) in the platform • Workshops experimented, internal as well as with consultants —> lots of ideas what could be done – when it's time to actually define how to do and start doing, **"when it starts to smell like work", it becomes often something "someone / R&D will take care of"** • Tens of flip boards have been photographed, have been generic —> **ideas have to be taken to concrete parameters to make them move forward** – discuss with suppliers, technology side etc • Workshops where ideas presented in groups —> good starts found —> put forward within the existing process (platform presented)	• 13 teams, three winners selected in hack • Internal voting —> top 3 was different (only the hack winner team was included) ▸ **Approximately half of the teams sent an offer and were in contact on how to proceed** • Called to one team and agreed to "keep in contact" • **The winner was taken forward —> decision to do this, funding granted, project created —> was going to business** —> however, a competitor came to market at the same time with similar solution with more features—> "Do we want to put a lot of money to something we'll be 2nd in the market with?" ==> **Was put on hold** and not yet put forward, looking for the right angle ==> frustrating for the winner but so it is for the host company • Incremental things: enhancing existing information systems' operation (enhancing internal efficiency —> no direct impact on business & enhancing mobile based customer experience —> no direct business benefit) ▸ **Positively surprised that the teams were actually professional** ▸ **External professionals** ▸ **To see what can be achieved** ▸ **New approaches and ways of execution —> doesn't go through the internal "tube", instead, there are no limits** ▸ **"A great chance to get positively surprised"** ▸ **Meeting and seeing competence and concrete companies – supplier as well as partner candidates** • **Many hack ideas "on stack"** —> constantly gone through if becomes current or there is resources available for execution	• Other POCs didn't go forward "in the process frame" —> **"some day something might become ripe from there"** • **Good to "know these people"** —> all teams were put in their pipeline for the future	▸ **The data provided didn't enable so much (delivery / consumption data) —> could have been different (more data and also more specific), now directed towards mobile prediction and similar solutions** ▸ **Formulating the challenge question better**, to adjust it to 1) the time available 2) the data available 3) the mentoring given —> **first timers will need guidance on this** ▸ **Project office the biggest bottleneck at the moment** as some acquisitions lately – hands full in integration —> **new things stay in the shadow** (every quarter gone through the ideas in the funnel with business team)	• **Allowing and encouragement paves the way for innovation —> company culture question** ==> you can't rule or reign innovations (freedom needed) • After the above comes the selections, framing and resource allocation ▸ **IPR: employee invention law *(työsuhdekeksintölaki)*, patents —> "the winning idea has many parents and so on" ==> contracts essential to avoid disputes in the very beginning ==> don't want to see that somethings is invented in their premises but could not be used** ▸ **Fast piloting is hard for the host, price tag easily 100s of thousands or even more**	• One person led the project (with content substance), IT looked at the data, other resources also provided by some other people ▸ **Collaboration and networking is key** ▸ **R&D department has only 3 people —> that resource is leveraged and often others get involved in the research programs to advance specific topics** ▸ **Finland is a small country —> it should be easier to share better what has been learnt and innovated** ▸ **"If our company knew what it knows, we'd be a much better company"** • Expectations from new intranet (Yammer style): better discussion, lower the threshold to participate ▸ **External people involvement essential —> near future business targets very concrete —> building industry ecosystem** ▸ **Would involve suppliers and public officers – would present the needs of the market** —> Ask suppliers what could work? & Ask authorities – "would this be enough?" ==> it doesn't make sense to spec something small and cheap if other players simply are not ready —> spec directly with suppliers and authorities • Digitalisation is not a high priority at the moment, now pretty much doing the basic business —> **"digitalisation will become a significant thing"** • Interesting movements in the market

	Motivation for collaboration	Background in open innovation	Benefits from experimentation	Future benefits	Challenges in experimentation	Future challenges	Other findings
Company 7	• Open innovation in their strategy —> "don't know if it is defined" —> **it's all about ways to do things faster, better, more efficiently** —> opportunities • Vision is to expand from **the ecosystem thinking, as strategy says: from product house to service house to solution house** —> take leadership in their field ==> **understood that can't be done alone, also openly communicate about it —> an ecosystem is needed, these activities are ways to build it**	‣ **Internal startups** ‣ **Innovation fund —> processes to get things forward despite the yearly budgeting for traditional development projects** • Consulting used • Accelerated projects with also external help ‣ **Agile methods applied to software & digital offering development** • University collaboration is active ‣ **Collaboration projects with other big companies from the industry —> industry specific areas are investigated further together** ‣ **"a wide range of activities"** • **A dynamic field** —> interesting to see what kind of tools are developed and what kind of things start to fly (vs. selecting e.g. just two things to focus on) • The host company's turf is wide: three business areas with own quite individual companies (own product selection and customers) – **the selection of open innovation activities needs also to be wide** • **Community building in the digitalisation field —> two person team, fairly new positions ==> enabling that things happen, not leading the "whole innovation" in the company** —> no micromanagement or telling what to do but instead acting as an enabler by providing new ways of working & thinking and showing example ‣ **An example: organising a hackathon – what does it enable? Making people meet different & new parties, new people, new developer candidates** ==> providing the basis and showing example (of how things can be done) – business units then pick the ways which suit them the best to make use of ==> **ways to go forward, ways for renewal, ways to do differently** • Organised activities within the digitalisation field: specific program manager initiatives & specific ways to follow and lead the things going forward ‣ **Their philosophy summarised: a corporation can create a good basis and help businesses to succeed, not to act as a besserwisser. Open innovation activities, events and projects enable the businesses to renew, develop and become more efficient.**	‣ **Product and service concept ideas** ‣ **Network and collaboration building** ‣ **Positive PR** ‣ **Help in recruitment, one subsidiary looking for software development talent —> employer image building (branding)** ‣ **Showing partner companies that open to this kind of way of working** • **Internal culture change, building and development —> collaboration, breaking silos** (at first people were working from their own foxholes but in the end the collaboration was very natural towards the common goal ==> **a lot of elements that will nurture the organisation in the long run** ‣ **The key takeaway: make own organisation to do things together —> bring startup mindset to the company, "many companies have hard times currently because of doing that old long development process"** ‣ **A strong start for building the ecosystem point-of-view, not just talking about it but actually executing, supported by the followup initiatives ==> not just a weekend-long excitement but a starting point for collaboration, to be built on top of this** ‣ **16.2.2017 [multiple discussions have been ongoing and some of them also finished & offers asked from some solutions but no new project has yet started —> things will eventually go forward with these teams]**	• N/A	• Risk 1: **[The hackathon] cannot be the climax but instead a longer story must be built** —> there needs to be clear purpose for this in the company's strategy and doing —> there has to be both the need and understanding within the company ==> can't be an individual's or unit's whim, top management has to be engaged and support • Risk 2: **Followup projects (post hackathon) need to be well planned beforehand** —> good to predict what kind of demos will be created —> who drives these proof-of-concepts forward? ==> **very challenging to define as the results are unknown —> how to prepare for unknown?** "who's reserving the money and for what?" ==> "if not prepared it takes 6 months for someone to put a project in the budget" ==> challenging: the development is agile and dynamic versus fixed budget cycles ==> preparation is key, otherwise will lose momentum • Risk 3: **Operational tasks —> "huge risk level" – a public event, visible to everyone** (e.g. social media), very open initiative —> "if something goes wrong, it will be on everyone's lips" —> "we need to be brave", often publicly listed companies who do this • Communication needs to be well thought out • **Very tight schedule** —> potentially many things could have gone wrong • **"Who dares to join the game?" —> big benefits but so are risks —> organisation's commitment crucial** —> a lot of effort is put on this (nobody has much buffer) ==> this needs commitment, not much is ready yet – each event has its own characteristics • 16.2.2017 [**Multiple discussions, some of them also finished. Offers asked from some solutions but no new project has started yet** due to host company's hard market situation —> critical eye on all new projects]	• N/A	• Good commitment from host company's side in the collaboration • **"Industryhack's strength is their network": good connections with the startup scene on a large scale (that other service providers might not have)** —> that can be priced based on its value (*arvoperusteinen hinnanmääritys*)
Company 8	• Digitalisation in talks • They have for long had information system development, started to rise from there – also other factors such as sensor technology development • Digitalisation was something that started to be taken to the next level —> people's awareness was rising – e.g. other known companies were already doing [hacking with Industryhack] ‣ **They started to think what digitalisation could mean in practice and in the long run to their company** • Started to work around these themes, some of which were already quite advanced (e.g. fleet management) • The area developed so strongly, that they got a feeling that **"let's see what the gang has to offer in practice"** • This [Industryhack] was a fresh and new way to do – it was easy to grasp and start doing ‣ **We got to map in a flexible way what the companies and people had to offer, in a very practical manner, so that also we got an understanding and knowledge where the technology is currently going and what is generally possible** ‣ **"[Industryhack] has been a quite significant tool for refining our holistic understanding [about digitalisation]"** ‣ **"[Industryhack] allows us to grasp quite well the whole view on digitalisation in the context of our own products" —> "that has been a big thing"** • "In Finland there is a habit of holding seminars and talking etc. That is hard to implement into own product and own daily work" ‣ **"What is awesome with this, is that it is concrete"**	• The spirit the host company has (which is expected from their people) is that even if they're building hard core machines **there is also flexibility to start this kind of projects and see what will come out of it** • It is very important that organization has an atmosphere that the first thing is not "NO" or "we know what we're doing" – this kind of thinking has never brought anything good – **it is important to be open for new things** ‣ **Doing with industryhack has been a big step for us**, we don't do "open innovation" otherwise – sure we have a network with other partners in digitalisation as well in addition to hacks ‣ **Industryhack has been to them the way to do open innvoation, it has been a good experiment about open innovation** • Not enough resources that would "open everything up and start to take in as much ideas as possible" —> it'll turn agaist itself —> **it's important to get things actually done based on these ideas** • They also get a lot of inbound ideas (of what should be done) from their own network (service, customers) • We're open and practical and we focus on doing • **What is written in our strategy is 'building ecosystems'** – "if it leads to open innovation – fine", but open innovation isn't otherwise stated there	‣ **When doing so concretely / practically: 1) the bigger whole starts to emerge: what can be achieved and 2) own people start to see opportunities – that's a big thing, it is so concrete** • Technology constantly develops and this is used to tackle that challenge – **we understand what happens in our context of operations in practice and what are the opportunities** • As a machine manufacturer we see what happens in operations and in tech via our own product and network –> **but when we go outside and take, let's say, artificial intelligence – what can that give to us? –> hackathons can answer to this kind of problematics. A huge opportunity for us to grasp and take the wider point of view** • Building the APIs was talked for long – **a schedule with a deadline was a good thing, the interfaces were done as there was no choice but to get them to work** –> otherwise this would have most likely been pushed to the future • 1ST HACK: • **Further discussions together with three teams** (with the most interesting cases) • **In fall 2016 we did small further POC development with those three companies** • **For 2017 we have budgeted (done before the POC projects mentioned above) each of these 100k€ for further development. One project is already ongoing [March 2017] and another is starting during the following weeks [in practice April 2017]. The firstly mentioned project goes on until summer 2017 and will land approx to the budget. With the secondly mentioned we are most likely going to do a couple of smaller followup development projects.** • 2ND HACK: ‣ **Discussions with five parties** ‣ **One pilot ongoing, until May 2017** • The interviewee: "Great that one POC has moved forward and is currently piloted and tested" ‣ **You submit yourself to see what opportunities there are for product technology development** ‣ **You see what kind of payers / people there are, what kind of network it's possible to build** ‣ **The network perspective is very important here – building an ecosystem around the product development in a time when technology develops so fast – that has a tremendous significance** • **It's all about people** – you get to see how people work, how innovative they are, what they get done • Also a brilliant method that the engineers have to crystallise in a couple of minutes what they've done • **Concrete stuff / doing, it's possible to obtain actual results** —> as discussed, there are pilots starting etc	• **Ecosystem. That is a clear thing** –from there the pilots and projects start – from there the added value comes • **"Experimentation."** —> in the future submitting ourselves to hackathons, there will be a hack-continuum – makes sense that we test and learn —> **we'll start to use this concept in practice to make sure our longer term strategy and vision come true but also to think new things and to develop the vision forward** – we'll experiment and give people an opportunity to do • **If you get the ecosystem / network to work well**, people get to know and used to it, **this is an opportunity to get results even more intensively** as the network builds up	• **"Our people were pretty stretched [before the hack]"** – on the other hand that's good as there is a lot of preparational work to be done in aim to succeed –> in the big picture this takes things forward, definitely not a wasted effort • Discussions not leading to piloting: • " an offer too big from an interesting POC team —> no budget or people for a pilot that large • " interface problems with two teams –> postponed ‣ **[When moving POCs to pilot projects] – this is where the limits of own product development (to start to lead these projects) occur** —> can't start to do with all of them simultaneously – that is not the objective either ‣ **own resources scarce in terms of people (staff)** • Having enough resources to take those good thoughts (POCs) forward – we have to prioritise which brings challenges sometimes • "it's boring that the normal doing and product development creates a resource problem for new starts: where to schedule these? where to put on the roadmap?" – now coming out the biggest software package in the host company's history: hundreds of changes, software work has been very intense and still continues ‣ **To make sure the beginning of the process (preparations) goes successfully** and definitions about where to focus on (challenge description) is good enough —> we succeeded well with that but will put effort in it in the future as well to make sure it will be done well ‣ **Jury member role is challenging** – we were a bit better on the 2nd hack and will be in the potential future ones as well —> **it would be great to somehow make the judging criteria commensurate** – it was challenging to finally put the teams in order based on their performance although the process worked well – all this also depend on how the innovation challenge was defined in the beginning –> the criteria should start to evolve already from there ‣ **If companies would start to do series of hacks, the right time interval is essential: hacks shouldn't be done for the sake of them, the timing has to be right —> we don't want to do the same work [solve same problems] but we want to go forward & our product development has to have had the time to respond to the previous [POCs] which should have been taken a lot further already –> otherwise the [product development] resource problem only cumulates**	• I dont know. This has demand for sure when the timing is right, the concept runs smoothly and product development gets things done. As it is concrete and practical, it is a good concept for sure. ‣ **Also important for Industryhack to constantly develop** ‣ **Important not to suffocate ourselves with this [related to the timing of hacks and product development resources]**	• At first people were maybe a bit like "why are we doing this / what's the name of the game", but then a strong pressure came quite fast and especially when the chairman of the board came to see what's happening [in the first hack in 2016] –> **he said afterwards "this was a healthy and smart thing to do"** ‣ **"We didn't experience strong change resistance in the organisation"** • About defining the hack objectives: small group in the product development who thought about it, especially software side people and product development management – also discussed through in executive group ‣ **The process beforehand is quite important, if that is not done properly the hack won't give that much either –> it was nice to see that people were motivated and did stellar job** –> helped quite a lot for sure that the hacks succeeded • The first thing on my mind when people ask – **"The atmosphere was terrific"** (short session, everyone present) ‣ **It's important how the hack is facilitated and how its structure is built – it seems to be working well** • No big critics on how it is done and how the results emerge and are presented • Clearly the teams who have participated hackathons, they also become quite good at them – people know what to do and **the concept seems to suit them nicely as well** ‣ **"If we start to talk about POCs being built in weeks instead of [current] three months, does this mean Industryhack integrates into its customers' product development processes?"**